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GEM

Global Energy for the Mediterranean

BUILDING BRIDGES FOR ENERGY ACROSS THE MEDITERRANEAN

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Bruno Lescoeur

VICE CHAIRMAN'S EDITORIAL

As this issue of GEM was about to go to press, we learned about the sociopolitical tensions in Tunisia and Egypt, which we are following very closely. Naturally, given the current situation, we cannot fail to express our deepest sympathy to all our members and partners in those countries.

We know that there is a great deal at stake in the region, and recent events have only proved this to be the case. However, although the current situation could delay some initiatives, we feel it is important to continue moving forward in our field. We remain convinced that even if the Mediterranean is encountering political instability at this time, the soundness of energy projects in the region is undeniable. In this context OME remains a key player.

Indeed, over the next 20 years the southern Mediterranean countries will witness the highest levels of growth - both economic and demographic - in the region. GDP will grow twice as fast as on the northern side, and population will increase by 40 million. All these expanded populations will be eager for a better quality of life, and this will result in energy-intensive growth. To cite one example, the countries of the southern Mediterranean will have to more than double their current electricity generation capacity. As in the rest of the world, this development poses a double challenge: security of energy supply and climate change.

Neither of these challenges can be met with a 'business as usual' policy: first, because, despite large reserves, oil production in the southern countries of the Mediterranean is expected to peak by 2020 and gas production could peak shortly thereafter. In addition, the current energy mix, which is 80% based on fossil fuels, will induce a 40% increase in CO_2 emissions by 2020, a scenario which is totally incompatible with the global goal of limiting climate change to an increase of 2°C.

Instead, meeting this double challenge will require action on several fronts. I would like to mention three. First, energy efficiency: we can save up to 25% of energy compared to the current situation. Second, renewable energies: solar and wind resources could be huge in the countries on the southern side of the Mediterranean. Finally, integration of electricity markets: developing a large single Mediterranean market will not only secure supplies but also stimulate renewable energies like wind and solar by offering them a sizeable advantage.

More than ever, OME is necessary in its role as a think tank promoting dialogue and making companies' voices heard. Moreover, at the end of 2011 OME will celebrate its twenty-year anniversary: OME is an established institution, and we have the opportunity to develop more detailed discussions of our achievements as well as our roadmap for the future.

Bruno Lescoeur
Vice Chairman

A Message from the General Director

20 Years of OME

20 Years after the creation of OME is a good time to reflect on past achievements but, above all, to ask ourselves whether this Association is still needed and what the future of the Association should be.

A simple look at today's energy scenario makes me believe that OME is even more necessary than when it was first set up.

A new market context

Certainly, the future is not any longer what it used to be. The times passed when a small number of energy companies had clear cut roles to develop the markets and ensure supply to end-consumers; when the growth of energy demand was taken for granted; and when producers and buyers had incentives to invest because they could engage in long-term agreements.

The energy market model chosen by the European Union has substantially altered past certainties

The energy market model chosen by the European Union has substantially altered past certainties. Also, the EU has adopted an economic model of low energy intensity and low carbon emissions. Relevant changes that, perhaps, have not been explained enough to the energy supply partners.

In 2008, the world went through a financial crisis without precedents that brought about negative economic growth rates, thereby lowering energy demand and putting importers engaged in take-or-pay contracts in a difficult situation.

Security of demand and security of supply are the two sides of the same coin

South Mediterranean and Middle East countries were apparently not so much affected by the financial crisis but the ensuing shortage of financial resources has harmed everybody, and the decrease of energy demand has given traditional exporters of fossil fuels reasons to be concerned: security of demand and security of supply are the two sides of the same coin.

Moreover, the emerge of unconventional gas, whose development potential and market impact are still to be evaluated, has added new doubts.

Uncertainty seems to be the name of the game now; uncertainty to a degree that we have not known before and that calls for new ideas to attenuate, or to learn how to live with it.

After these lines had been drafted, a wave of socio-political unrest is shaking countries of our South Mediterranean partners. We hope and wish that the changes taking place now are for the better. However, the situation calls for immediate and unconditional help from the Mediterranean Community. Energy is the blood of the economy and the energy community has to keep on working together whatever the circumstances of any country are.

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A new partnership in energy and the role of OME

Enhanced cooperation between energy companies is necessary to cope with uncertainty. In my opinion, it is indispensable to work out a new kind of partnership that goes beyond the traditional commercial relations; a partnership to share risk and profit built on thorough dialogue and understanding of common challenges and opportunities, and where OME can play a key role

OME is a platform for this dialogue because it is the association gathering leading energy companies from all energy sectors, exporters and importers, from the South and the North of the Mediterranean.

One of the bridges towards the progressive integration of Mediterranean energy markets

OME can be one of the bridges towards the progressive integration of Mediterranean energy markets and an instrument to reinforce cooperation with neighbour Regions, both of which are necessary initiatives if the Mediterranean Region has to keep a role in a global context where the attention is switching towards the emerging economies in the Pacific Basin. Sharing the experience of the Members which have gone through integration processes will be useful for all.

OME also provides objective analysis and perspectives because it is the entity of reference and the think-tank for Mediterranean energy issues.

OME is the entity of reference and think-tank for Mediterranean energy issues

Evaluating ongoing practices and emerging technologies in the fields of energy efficiency, renewable energy, climate change, etc. are useful services the Association can render to its Members. OME has developed a strong expertise in these areas since the first years of the Association and is well credited due to its equidistant and non profit character.

After 20 years of continuous support from the major energy players of the Region, the Association has set up an important asset: OME is today a consolidated brand and a credible voice in front of energy authorities.

Objectives for 2011

In the work plan approved by the Executive Committee last December and submitted to all Members in January, there are specific actions aimed at encouraging dialogue, internal and with energy companies of neighbouring Regions, and performing the role the Association was created for. To mention just some of these actions:

Meetings: the next General Assembly in Marrakech hosted by ONE (Office National de l'Electricité) where topics of common interest will be proposed for Members to debate and a Mediterranean – Gulf conference in Cairo in autumn to analyse supply and demand perspectives.

Training: after the success of the first session last year, we have planned similar workshops this year and are inviting our Members to give some of their young staff the opportunity to obtain an overall perspective of the Mediterranean energy context and share views with colleagues from other companies.

OME will also continue publishing exclusive reports such as the Mediterranean Energy Perspectives, in-depth analysis of specific countries, GEM Magazine, and completing the studies proposed by the Technical Committees in the fields of Hydrocarbons, Electricity and Renewable Energy and Sustainable Development.

OME structure

To perform efficiently these tasks, OME has shaped a very lean organization made up of an excellent team of energy analysts and professionals from Member companies working together in committees. This structure is a unique stance for launching initiatives of common interest for the Mediterranean energy industry, providing independent opinions and conveying unbiased messages to stakeholders.

All in all, OME is the right place for exchange of experience and transfer of information in many different matters as energy perspectives, policy and regulation, interconnections, energy efficiency, renewable energy, etc. As the value of these exchanges is definitely enhanced by the effective implication of all Member Companies, I want to conclude these words by inviting all our partners to keep on actively involved in all OME activities and, particularly, in the work of Technical Committees.

Not least, I wish to sincerely thank all Members for their support and encouragement along the last 20 years and OME permanent staff for their genuine commitment.

Pedro Moraleda
General Director

A very lean organization made up of an excellent team of energy analysts and professionals from Member companies

SPECIAL FEATURES

INTERVIEW WITH MR. PIERRE GADONNEIX

CHAIRMAN, WORLD ENERGY COUNCIL HONORARY CHAIRMAN, EDF

What are the main lessons and conclusions of the last congress of the World Energy Council held in Montréal? What are the new actors in the energy scene that Montréal Congress highlighted?

The 21st congress of the World Energy Council (WEC) held in Montréal last September has been a great success and gathered more than 7500 participants from 140 different countries representing governments, industries, organizations and leaders from all energy sectors such as coal, nuclear, oil, gas, renewables, hydropower...etc. We had the opportunity to deal with several issues relative to uncertainties and priority actions...There have been many outstanding contributions on all topics mainly from world energy leaders which we summarized in a specific leaflet, "Highlights from Montréal," available on our website[1]

It is a bit difficult to sum up a four-day conference in just few elements. However, three topics have mainly rallied all the delegates. These topics have not been dealt with such importance or detailed content in the previous congress held in Rome three years ago.

[1] http://www.worldenergy.org

First topic:
We need massive investments, which have to be undertaken despite the uncertainties. If we do not invest, we may not avoid an energy shortage. Energy needs are considerable everywhere in the long term.

First Topic: We need massive investments, which have to be undertaken despite the uncertainties. If we do not invest, we may not avoid an energy shortage. Energy needs are considerable everywhere in the long term.

Among the important topics raised in Montréal is the priority to growth. We clearly need an energy production growth in order to meet the needs of the world economic development and improve the living standards of populations. As part of the energy production growth, we need without any exception all sorts of energy.

Energy needs are growing, which make considerable investment decisions unavoidable. By 2030, energy needs will increase by an average of 30% in the world, but emerging countries will need far more than 30 %. By 2030, China, for example, will need the equivalent of today's Europe consumption plus its current consumption! Electricity consumption growth will be faster and will be doubled between 2000 and 2030, thereby requiring the doubling of the current infrastructures (network and production facilities).

To meet such growth of demand, all sorts of energies, including fossil fuels and coal have to be mobilized; this will be our only choice. Unlike the previous Congress in Rome in 2007, we have realized that coal still has its place. Indeed, it is often considered as the backbone for the production of electricity: it accounts for 80% of China's power generation and 50 % of US' power generation.

Oil, gas, renewable energies, and nuclear will have their role to play, but we will need to improve energy efficiency and mitigate energy consumption. For this purpose, we have to invest in buildings, technologies, networks and industrial processes...etc. 40% of CO_2 emissions reduction which are necessary to limit the world temperature increase to a maximum +2° (Copenhagen Agreement dated December 2009) should be carried out by a better energy efficiency. This is a huge potential which will require important investment efforts.

However, investments needed by 2030 have still not been decided. It is a real problem.

Considering the substantial time required for construction in the energy sectors (nuclear power plants require a few years at least to be built), shortage risk is to be considered seriously.

Why investors or financials do not make up their minds? The answer is that the world today is facing many uncertainties, among which: the way countries will exit from the crisis, the degree of recovery and the new model for a long term economic growth; the **gas market evolutions** and the gas glut duration; the level of **ambitions of the national climate policies in different countries** and its impact on respective efforts being made on nuclear, renewables and energy efficiency; the **evolution of the Chinese energy system** which will have an impact on all energy sectors because of the country's demand and volumes of imports and exports for example. China's decisions concerning gas

development and the Chinese resources of unconventional gas will have an important impact on international prices of gas. Finally, the effects of such an important market will play a major role on the development of technologies such as nuclear and renewables. There are also uncertainties regarding technologies... which we will discuss later.

Facing such uncertainties, investors tend to favor less risky investments, quite often on less clean and sustainable technologies, even if this attitude is, in a way, creating a risk in the long term.

We should keep in mind the urgent need to invest in the energy sector and give priority mainly to rational investments on some mature, safe and sustainable technologies. **Investors need clear signals from market and/or authorities in order to enable them to choose in the most optimal way.**

The second major topic that came out of the Congress is fossil fuels and mainly the role of unconventional gas, whose exploitation has recently been made possible thanks to technological innovations.

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The exploitation of unconventional gas allowed a considerable increase in gas resources, mainly in the USA, and contributed to the decrease in gas prices. As a result, many countries, particularly the Mediterranean ones, are interested in this new gas. However, these new gas resources with attractive prices are threatening investors' choice on other types of energy sources, mainly nuclear and renewables.

In Montréal, the boom of unconventional gas has been one of the most debated subjects. This is a rather new topic which has not been raised until this year even if the technologies used did in fact exist quite for a while and had already been used for the last twenty years. However, these technologies had only been promoted by small companies in the exploitation of deposits of small capacities. This could not threaten the competitiveness of other traditional deposits. With the breakthrough of technologies (horizontal drillings and hydraulic fracturing, we managed to develop a controlled, standard and competitive exploitation technique.

Many actors of the energy industry think, that with the current technology, there exists now a real opportunity in using this gas. The sudden change is not related to technology but the anticipation of the available resources and the production volumes which enabled the US, for example, to be freed from LNG imports...The globalization of the gas glut all comes from that point, when LNG originally meant that the US had to find new routes and new clients around the world...

What are the expected impacts of the expanding exploitation of unconventional fossil fuels?

Adding to the direct effects of the crisis (decrease in gas demand), **gas prices have decreased by half on the spot market** and have contributed to make gas very competitive compared with other forms of energies.

The new fossil resources discovery is good news since it loosens the pressure for some sectors such as Aeronautics which have no substitution solution for fossil fuels.

Third topic:
The need for energy and climate public policies as well as a new global governance.

It is also good news when gas is used to replace coal in the production of electricity, for example. This indeed allows countries to start transitioning to cleaner energy systems at lower costs. Hence, China wants to increase gas from 4% to 10% by 2010 in its energy mix.

The unveiling of these new gas resources will give us some more time to develop renewable technologies and resources at reasonable costs, while controlling our resources in the long term.

However, it is difficult to predict the consequences of the gas glut in the long run, since outside the US, the geological inventory of the production capacities for unconventional gas have still not been carried out, and we still do not know the real potentials and capacities of unconventional gas on other continents.

However, I strongly believe that unconventional gas is not a real "game changer" in the sense that it should not affect our long term and global energy challenges. Indeed, even if technology limits can be extended, fossil fuel reserves are still, in the end, limited.

In addition, **an increase in gas prices is quite predictable in the long term**, as we are using more and more sophisticated technologies which will have to meet safety standards and protect the environment. These technologies will thus be more costly. As a CO_2 emitting energy and a substitute to oil, gas will for sure re-couple with oil prices, sooner or later. Moreover, if CCS is required or a coal price is being put in place (as it is being examined at the moment by the British Government), gas prices will definitely increase and be less competitive as they are today.

Finally, **gas will always emit CO_2**; therefore, it will not totally meet the needs related to the protection of the environment. The unconventional fossil energies cannot be radical "game changers" as long as our main goal is to transition to a zero-carbon energy system!

This is the reason why **it is necessary to have long term policies for an effective diversification of production sources in a low-carbon energy system.**

Third topic: the need for energy and climate public policies as well as a new global governance.

National public policies.

This topic was acclaimed by most delegates including liberal ones. **It is obvious that market alone cannot overcome the 3 main global energy challenges, i.e: energy security, climate and environment protection, and the reduction of energy poverty.**

We need a new regulation and good governance at both national and international levels.

What is then a "smart" energy & climate public policy?

During our Rome congress three years ago, we have decided to identify and assess the energy & climate public policies of more than 30 countries. In 2009, WEC released its first "Assessment of energy and climate public policies" which aimed at identifying the good practices in the world and their key factors of success. A new edition of the Assessment was released at our congress in Montreal, last September.

What are the main lessons we can draw from our study?

Firstly, **public policies should be visible and stable in the long run.** In a sector such as energy, where infrastructures are meant to last up to 50 and 60 years, the stability of rules is crucial.

To make sure policies can be stable in the long run, **we need to ensure that policies minimize the costs**. Failing to do this, reality will, one day or another compel policy-makers to amend their measures (cf. Spain or France support for the PV), which could lead to a stop in the investments, and then for sure, to a future energy crisis. In order to ensure cost-control and minimize costs, **policies have to be conceived on and to promote real costs** (including long term ones, safety and environment ones). Distorting prices cannot lead to an optimum affectation of resources, whereas promoting prices based on the reality of costs can favor sound investments.

Today, we already have **mature technologies**, at reasonable costs. These technologies should be given priority. Among which, we can find renewables like hydropower, wind and even solar under specific conditions.

On the other hand, we also have technologies that are immature and whose costs are still too high. These need further research and development and demonstrations before implementation. An African Minister mentioned, in Montréal, the key role of **hydropower** as a clean and economic mean to meet the growing energy demand deriving from the urbanization and industrialization requirements of Africa. He also mentioned the role of photovoltaic technologies for rural electrification in Africa but pointed out its high cost which often requires subventions. Regarding concentrated solar power (CSP), he mentioned that technology costs are still high but recommended to keep the efforts and focus on this technology by financing demonstrators in order to provide energy to Africa, first, not to Europe.

So, in all countries, developed or emerging, we have to focus on technologies and policies that can minimize costs.

Through **organizations such as WEC and OME**, industrials as well authorities have opportunities to discuss and exchange views in order to encourage effective public policies that are at reasonable costs and thus, acceptable by the populations.

New international governance.

WEC studies have shown that public policy for each country is not enough. There must be some **coordination at the international level** in order to make these policies compatible. Some topics need to be dealt with in a global way, particularly the global warming. There is no point

in making a national policy without any international coordination. These coordination efforts were at the core of the post Kyoto discussions, brought up recently in Cancun and which will be further discussed in Durban, South Africa next December.

Safety of energy infrastructures is, among other global topics, one which undoubtedly requires international governance. This is already the case for nuclear which can claim a global organization for safety; but many other energy sources still have to put in place a global debate and organization on safety. This is the case of:

- Oil, as the accident in the Gulf of Mexico recently showed. The accident reminded us that oil technologies still require consideration and a new global debate in order to ensure safety of People and infrastructures.

- Gas, mainly with technologies used for extracting unconventional gas. This safety issue is, more and more, being raised both in Canada and Europe.

A global harmonization of safety rules is really required for all sorts of energy, in order to ensure the safety of people and infrastructures and make our energy sources acceptable to all.

A last topic which requires global governance is rather sensitive due to its political aspect: it is related to the **international rules** of energy trade and investments. These rules have to be implemented in order to develop a green growth without creating disparities of competition and unbalances between regions all over the world. We need to have these rules put in place quickly as we can already witness transfers of employment from one country to another, thereby tending to threaten the acceptability of the public policies.

Other key messages from the Montréal congress.

Many other topics have been of course discussed but some need to be developed in much more details.

- This was the case for the specific energy issue related to the growing **world urbanization**. More than 50% of the population all over the world lives in cities and this tendency is increasing. This impacts directly the three main challenges of the energy sector: security of supply, environment protection and the reduction of energy poverty. Nevertheless, there is a specific way to deal with energy issue in big cities as **urbanization represents both constraints and opportunities.** As an example, the **carbon free electricity and energy efficiency will clearly play an important role** in cities in the future. In addition, we need to implement new urban policies which take into account all aspects of urbanization's problem (transport, buildings, industry, network...etc) A first WEC study has been released in Montreal this year on this issue and will be detailed in the coming years.

- WEC has decided to become more involved in the issue related to energy access and the inequalities: How to

give energy access to the1.4 billion inhabitants who still do not have access to electricity? **This question requires institutional, political and technological responses.** This however, does not only concern emerging countries but also what we call the "fuel poors" in developed countries. Taking into account **the increase in energy prices**, we should give particular attention to the poorest **and help them to access energy.** We might well need transfer mechanisms from developed countries to emerging ones.

What are the main topics WEC is planning to work on for the next three years?

Public policies assessment, Survey of Resources & Technologies.

There are many ongoing projects, among which: updating studies which are already carried out. The Assessment of Energy & Climate **Public Policies and the survey of energy Resources and Technologies** are among these projects.

We will review all energy & climate Public Policies in more than 30 countries and will compare them in terms of their efficiency. In this assessment, we will specifically focus on particular aspects of public policies such as mobility and a particular attention will be given to cost analysis of the different technologies.

Some important conclusions of the annual survey regarding resources and technologies will certainly be useful for Mediterranean countries. I am thinking mainly of those relative to renewable technologies, solar technologies, wind but also those related to the gas market and opinions relative to regional interconnections and important technology projects such as DESERTEC and MEDGRID...

Long term Energy Scenario Study.

A long term prospective study called "2050 Energy Scenario" has been launched by WEC. Participants in Montréal also expressed a strong need of consideration for contrasted scenarios taking into account the uncertainties mentioned above in terms of demand or technologies, and the evolution of behaviors. This will be a unique study that WEC wants to make as a reference and concrete tool for energy leaders among the world. It will be based on a bottom-up approach to devise different possible scenarios at regional scales according to different choices in concrete technologies, policies, demographical change.
I hope this study will be a very useful to all energy leaders of the Mediterranean region and will help them make their choices.

Rules of energy trade & investment.

I will mention our work on **'"rules of energy trade and investment" that I have briefly raised above.** In other words, how to make the development of international trade compatible with national energy policies? Energy services and product are based both on **raw material trade** which is subject to regulation and tax, but also on technologies, goods and finished goods and transfer of experts. Many developed and emerging countries are involved in the **'green economy' race** and want to keep employment opportunities in their own countries, but all acknowledge the need to develop technology exchange/ trade and transfer... WEC is working closely with the WTO on that topic.

I think this issue may be of interest to the Mediterranean countries which are involved and committed to develop green economy and which have a long-standing tradition of trade.

Energy urban innovation.

A study on energy urban innovation is being carried out as the urbanization boom will imply an increase in energy demand. Therefore, there is an urgent need for investments as cities will be consuming 75% of the world energy and emitting 76% of CO_2 by 2030.

Moreover, electricity consumption is quite specific in cities as 80% of energy consumption is due to transportation and residential use. **We need to find a mean to reduce the cities' energy consumption. For this purpose, the promotion of free carbon electricity, public transportation and energy efficiency is required as well as new urban policies based** on new technologies such as smart grids, smart homes, smart cities and renewables...etc.

The Mediterranean countries are mostly concerned with the urbanization growth and should find in this study many essential elements which may urge them to look for concrete and realistic solutions to change the path towards a sustainable urbanization. Their contributions will of course be very much appreciated.

Energy Access.

As already stated above, **energy access is another issue which met great interest in Montréal.** Energy access usually raises issues related to tariffs, subsidies and technologies.
Energy access is not the same whether in cities or rural areas.

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- In the cities, and mainly with the development of townships in some developing countries, the populations can have access to energy through an existing network, but the legal/ institutional structure is still missing to ensure that energy access can be safe and sustainable.

- Whereas in rural areas of some emerging countries, the network is not developed enough and our main concern is how these regions can concretely have access to energy? India is probably among the most concerned as a large number of India's population still has no access to energy, despite the country's sky-scarping economic growth of 9%.

Our study will also be based on a bottom-up approach and will thus highlight case-studies in India, Asia, Africa and Latin America with the main purpose of providing various solutions which can be applied to different situations and cases.

WEC really counts on the involvement of the Mediterranean countries in this study as well.

What are WEC opinions concerning the development of renewable sources of energy in general and in Mediterranean countries in particular? What about energy efficiency?

Renewable energies have a great role to play in the low carbon energy mix in the future as already mentioned before. So, I will only underscore a few but key points.

Firstly, hydropower is the very first renewable energy and I think we should not deny the fact that there is still a place for hydropower projects in the world, mainly in Africa and South America, and also in India and China where there are large potentials.

Water is also another important issue on which WEC is planning to work in the future. During a recent visit to Nepal, I had the opportunity to witness the political debates about water access in the region, since the water from Nepal is being consumed in India! In general, water and energy are closely related as energy production often requires water on the first hand, and as energy production can be used to provide water access on the second hand. For example, hydraulic dam often ensures the development of water usage by populations for their economic activities and needs. **Therefore, hydropower should not be neglected as a contribution to water supply. Last but not least** both energy management and water management are involved in food production for example. We should really consider **water and energy** together **in order to meet the challenges facing emerging countries.**

Hydropower is one of the key technologies in renewable energy.

Secondly:

- Many technologies are mature, and accessible at reasonable costs (together with a cost of an avoided ton of CO_2<50).

- In addition, 'stop and go' has to be avoided in all energy policies, but this is particularly true for renewables where economic actors are still very fragile and can be much affected by a shift in policy, as this was the case in many European countries which recently stepped back in their support to the development of photovoltaic energy.

- **From my point of view, renewable energies represent an area where research and development should be further supported.**

Mediterranean countries have great opportunities in renewables as the region is endowed with sun, oil and gas which are important assets! I think we really should work on renewable projects but only on those with very competitive costs.

There are some projects of this kind such as MASDAR in Abu Dhabi, which currently faces some difficulties,

but can provide us with interesting return on experience on different technical challenges to overcome. As an example, solar panel performance and productivity is rather disappointing, mainly due to the local dampness, the sand and dust spread on the panels, which affect their performance. This reduces consequently the power and intensity of the panels, and generates extra and additional costs for maintenance.

These pilot experiences can reveal some factors that engineers did not consider while conducting their researches.

To sum up, we are still at a stage where renewables really need to increase and develop research, experiences, demonstrations and pilot projects.

The new technologies for renewables should meet with the international trade rules as much as possible and should be implemented and used in the countries conducting the projects. Otherwise, populations will not accept to overpay an energy which creates job opportunities elsewhere. This is a real fact!

According to WEC, renewables are essential for the low carbon energy mix of the future together with energy efficiency and all sorts of energy.

Energy efficiency, which is one of the most cost effective low-carbon technology, still has a large potential particularly for transportation and housing. 40% of the efforts expected to limit the world temperature increase to +2°c, come from energy efficiency.. Indeed, the less-emitting energy is still the energy that we do not consume! We have real potentials and possibilities with some existing technologies that are already accessible such as heat pumps, isolation, public transportation...and public policies that can help change consumers' behaviors. **We really need to change the way we consume energy.**

You know well OME as you are one of the founding Members. What would be your message to OME, its Members and GEM readers?

Mediterranean countries are facing huge energy challenges: energy security mainly in order to meet the future energy demand growth, climate and environment protection, technologies for carbon-free energy mix. There are many topics of common interest between OME and WEC. South Mediterranean regions have important energy resources in terms of fossil fuels and renewables mainly solar, wind, hydropower. Nevertheless, most of the hydro and hydrocarbon resources have been already exploited and used.

Concerning renewables, there will certainly be more and more solar projects in the Mediterranean. Desertec may be a good concept but we have to really assess solar technologies, with regard to additional costs and the opportunities that can be created for local populations. Mediterranean countries have to look for effective solutions. In my opinion, solar energy exploitation should firstly serve the countries where it is produced. Transportation costs are huge and should be considered too before proceeding with energy exportations. Desertec, Medgrid and the Mediterranean Solar Plan are ambitious projects which should be fully appropriated by south countries. There is a real challenge for dialogue and cooperation.

There are, therefore, many topics that WEC and OME should jointly consider. WEC has many work-groups involved in the Mediterranean countries and OME should further be involved.

As you know, Algeria is a WEC Member Country, and our next WEC General Assembly will be held next November in Oran. I hope that this General Assembly will be an opportunity for real exchange, concrete discussions, presentation of studies...this could also be a good opportunity to share our reflexions together!

SPECIAL FEATURES

André Merlin, President of MEDGRID

MEDGRID

OPENING NEW PATHS TO ELECTRICITY FOR A SUSTAINABLE ENERGY DEVELOPMENT OF THE COUNTRIES IN THE UNION FOR THE MEDITERRANEAN

INTRODUCTION.

The fight against climate changes and the development of renewable energies require the implementation of ambitious co-development projects to reduce greenhouse gas emissions, while ensuring energy security and contributing to economic growth. This is the aim of the climate-justice plan. Such important initiatives are particularly necessary in the Mediterranean basin.

Within the framework of the Mediterranean Solar Plan (MSP) of the Union for the Mediterranean[1] (UfM), but also of the World Partnership on access to energy in African countries and the Less Developed Countries (LDCs), the French government launched a mission on 20th November 2009, named "Transgreen". This mission was to analyse the opportunity of a future long-distance direct current power transmission grid crossing the Mediterranean Sea, to deliver electricity from wind and solar power stations envisaged in the MSP to Europe in order to reach the ambitious goals of renewable energy, and by the way to initiate the first steps for an industrial partnership.

After this initial phase, the outcomes were very positive. A new step, of industrial nature, was reached by signing a memorandum of intent on 5th July 2010, which specified that before the end of 2010, a consortium will be created through an industrial study office, named MEDGRID®, in charge of the implementation of this policy.

ELECTRICITY IS AT THE HEART OF ECONOMIC AND SOCIAL DEVELOPMENT AS WELL AS QUALITY OF LIFE.

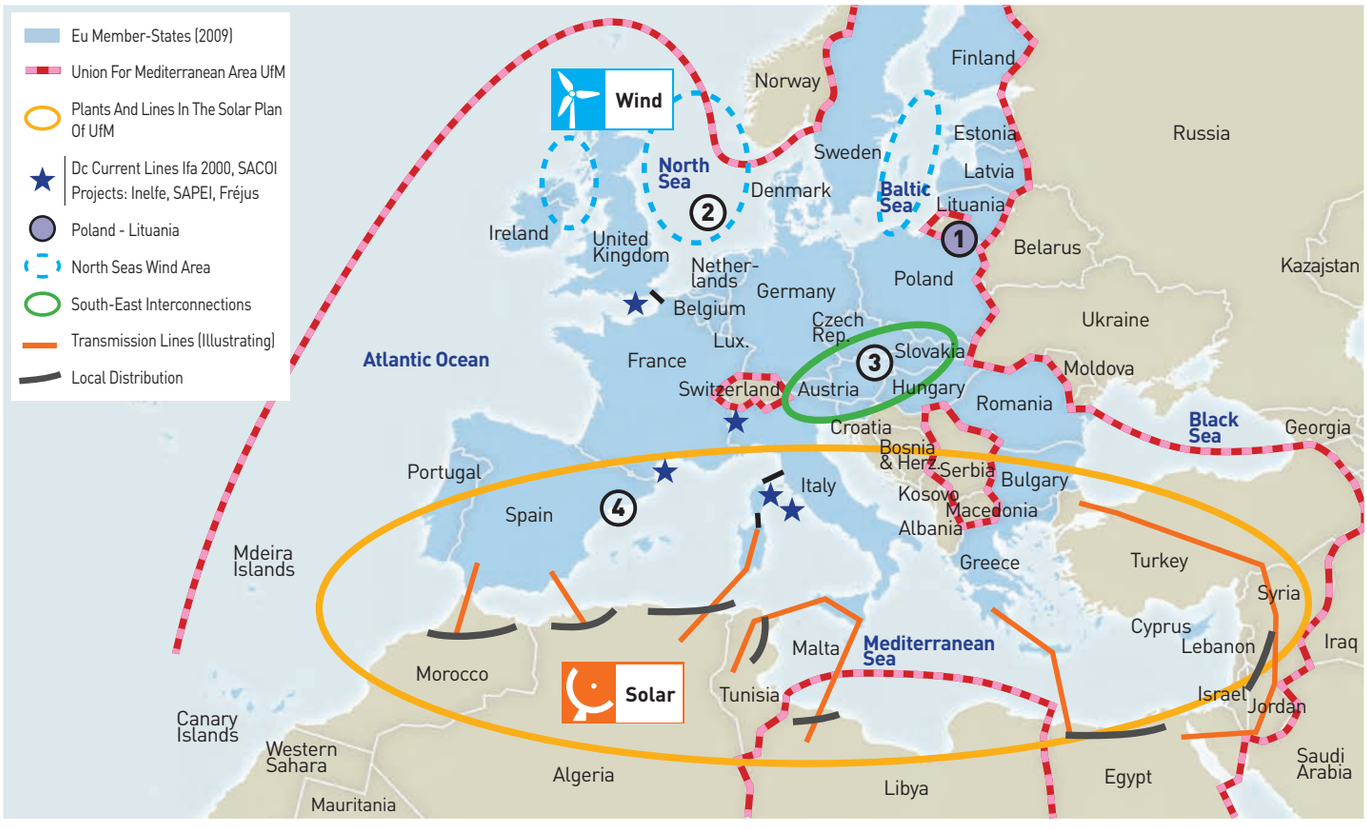
The decrease of fossil resources, the increase and volatility of their prices, the effects of greenhouse gas emissions on the climate and security of supplies impose many challenges.

The world demand for electricity will continue to grow as a result of demographic changes, industrialization and urbanization. According to International Energy Agency (IEA) technology perspectives, by 2050, electricity consumption will triple and electricity will increase its share of total final consumption from 18% in 2010 to 30% in 2050. Electricity will be preferred for better energy efficiency and more accurate control in numerous industrial processes. As a consequence, efficient low carbon electricity will be used increasingly as a substitute for fossil-fuel.

Transition to a low carbon economy drives the expansion of the EU electricity transmission networks.

For its part, the European Union (EU) is developing a major strategy for the transition to a low-carbon economy and wants to increase its security of supplies. It has set three goals for 2020: reduce greenhouse gas emissions[2] by 20%, take a 20% share of renewable energy[3] in final energy consumption and save additional 20% of energy. As a result of which:

FIGURE 1: INFRASTRUCTURE DEVELOPMENT OF ELECTRICITY TRANSMISSION



- European Commission (EC) anticipates that the electricity share in final consumption would increase from 20% in 2010 to 25% in 2030. In the reference scenario, electricity demand would grow 1% annually for the next twenty years, with power generation rising from 3300 TWh in 2010 to 4050 TWh in 2030.

- EC promotes the development of renewable power generation, which would increase by 50% in the reference scenario and 100% in the green new policy scenario[4] in 2020 compared to 2005. Drastic change in the electricity mix will require a strong evolution of the power grid, in order to integrate a large quantity of intermittent renewable energy (wind and later on solar);

- EC insists on improving the security of supply for mutual back-up of power grids of neighbouring countries and regional neighbouring power systems;

- EC underlines that a further integration of the internal electricity market needs to increase the interconnections between Member-states.

To reach such objectives, for security of supply, for connection of renewable sources and for development of the market, the EU commission has planned- for next 10 years- a strong development of the infrastructure of high voltage grids in coordination with transmission system operators (figure 1). Four major strategic projects of the EU have been identified in this field:

1. Interconnection of Baltic countries to other EU member-states;

2. Offshore lines to connect wind farms in the North and Baltic seas;

3. More powerful interconnections in South-East Europe;

4. New interconnections around and between the north and south coasts of the Mediterranean Sea.

It includes: additional interconnections within the EU grid; an extension of the interconnections beyond the present EU grid limit (around and across the Mediterranean Sea, with the Russian IPS UPS system); a better efficiency of the EU grid operation.

In the Mediterranean South and East countries, electricity infrastructure must meet the fast increase of electricity demand.

According to the OME (Mediterranean energy observatory), the growth in electricity consumption is expected to be 6% per year until 2025 for the Mediterranean South and East countries[5] (MS&E). This requires a reinforcement of their production and transmission capacities.

By 2020, power generation capacity has to increase from 100 GW to 200 GW in these countries. Gross electricity generation in the MS&E is presently dominated by fossil-fuel (nearly 90%). Share of hydro would stay almost

constant at around 12%. But other renewable sources have to contribute to a more balanced electricity mix. In the Mediterranean solar plan scenario, wind and solar share of power generation could reach nearly 10%[6] by 2020 (0,5% today), by adding 20 GW of new capacity to the 15 MW already planned in the reference scenario.

How to meet the electricity demand in a sustainable way and reinforcing energy security?

The view promoted by MEDGRID aims to call up the synergies between northern, southern and eastern Mediterranean countries through co-developing energy strategy.

Two major programs should help with this strategy: the creation of a **Mediterranean power grid** linking EU with south and east Mediterranean countries, one of six priority projects of the European Commission for energy security, as well as the **Mediterranean solar plan** (MSP), one of six large co-development projects held by the UfM in order to address common challenges for countries on both sides.

THE MEDGRID PROJECT, the southern and eastern countries of the Mediterranean have a great potential of solar and wind electricity. Launched in November 2008, the MSP aims for a new production capacity of 20 GW by 2020.

The investment is estimated to be between 38 and 46 billion euros, including 6 billion euros for the connection of power generation units and interconnections with EU.

Some of this electricity (5 GW) should favourably be exported to Europe, to contribute to the profitability of solar power projects installed in the Sahara : a part of the electricity produced by solar power plants (around 25%) could be sold to Europe at higher prices close to the European feed-in tariffs. By this way, the EU could well increase the share of renewable energies in its energy consumption, in accordance with the commitments outlined in its third energy-climate package. Article 9 makes it possible to import green electricity from outside the EU to reach the objective of renewable share.

Transmission and interconnection lines are vital and very valuable for both EU and MS&E.

Bringing renewable electricity from the south shore of the Mediterranean Sea to consumption areas in Europe requires transmission infrastructures and especially underwater high voltage direct current lines (HVDC). Up to now, there is only one double AC line of 1.4 GW linking Africa and Europe, under the Strait of Gibraltar. The first line of 700 MW and 400 kV started to operate in 1997, and its capacity was increased to 1400 MW in 2006. A third line is planned to reach 2100 MW. But the needs for interconnections are much higher.

The new lines will open the European market to renewable electricity coming from the South. The interconnected network will enhance the security of power systems particularly in the southern countries. Import and export of electricity will respond to peak demand and intermittent renewable production. Multiple exchanges through the new grid will create a large market for electricity in the Mediterranean basin to meet demands at the best cost, by using the cheapest power plants at each time available and sharing power reserves.

On a wider scale, these infrastructure investments will stimulate growth, create new activities and jobs, helping the co-development of the countries in the Union for the Mediterranean.

MEDGRID COMBINES LEADING PARTNERS in the business of electricity production, transmission and distribution, financing of infrastructures and services within the economics of climate change.

After a memorandum of intent signed on 5th July with 12 partners, MEDGRID company was launched on 9th December, in the presence of Eric Besson, Minister of Industry and Energy and Ahmed MASSADEH General Secretary of the Union for the Mediterranean.

The shareholders are : Abengoa, Alstom grid, Areva, Atos WorldGrid, CDC infrastructure, EDF, Ineo (GDF SUEZ), Nemo, Nexans, Nur Energie, ONE, Pan Med Trading and Investment, Prysmian, Red Electrica, RTE, Siemens, Soitec, Taqa Arabia, Terna, Walid Elias Establishment. French agency for development (AFD) will sign a strategic partnership with MEDGRID.

Their common ambition is to open up new pathways for sustainable electricity by studying the feasibility of electricity interconnections between northern and southern shores of the Mediterranean Sea.

An innovative and open approach to combine skills, mobilise synergies and develop cooperation.

These new pathways will be achieved by new transmission lines which will enhance the integration of power systems. For them to be fulfilled, MEDGRID will take open and innovative approaches, whether concerning technology, setting up of projects or cooperation modes.

These projects will bring together many stakeholders over ambitious, technological, economic, industrial and societal objectives. MEDGRID partnership is open to other companies, particularly those in the MS&E.

MEDGRID
will work closely with the governmental authorities of related countries, the European Commission, the scientific community, investment banks and development funds and nongovernmental organisations.

MEDGRID will contribute to the energy policy objectives of the EU third energy-climate package and of the solar plans of the MS&E.

The MEDGRID industrial study office has five main commitments:

- Design the Master plan of the trans-mediterranean interconnections for 2020, leading to real investment projects;
- Promote a regulatory and institutional framework for the exchange of green electricity;
- Assess the benefits of investment in infrastructure and electricity trade on growth, economic activity and employment;
- Develop technological and technical cooperations with South and East countries in the area of power grids;
- Promote advanced high voltage direct current (HVDC) technologies for power transmission.

MEDGRID, DII : complementary initiatives.

MEDGRID's work is conducted in coordination with other Mediterranean Solar Plan projects, with DII (Desertec Industrial Initiative) which promotes the creation of large wind turbines and solar plants in North Africa and in the Middle East ; this is complementary to the MEDGRID initiative working in the field of transmission networks.

The development of large-scale solar power plants and ultra high voltage transmission lines of large capacity will enable solar energy to be competitive. The deployment of these facilities represents a significant potential for jobs creation, industrialisation and economic and social development in partner countries.

CONCLUSION.

Power interconnections in the Mediterranean basin are at a very early stage, presently limited to a Morocco-Spain link. Clearly, many key factors are in favour of a large modern grid in the Mediterranean basin, taking advantage of essential valuable and unlimited sun and wind renewable energy resources.

MEDGRID is a fascinating co development project, which creates the best conditions to promote the sustainable development in the Mediterranean basin.

The roadmap of MEDGRID focuses on 2020 and beyond, in accordance with the objectives of the European energy-climate package and of the South and East countries' solar plans.

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[1] Launched on the 13 July 2008 in the frame of the French presidency of the European Union, UfM promotes a new co-development policy in the Mediterranean region. It unties residents of the Mediterranean states and the member-states of the European Union, 43 countries.
[2] From their reported level in 1990.
[3] Base 2005, beyond previous policy effects and structural changes.
[4] cf. European Commission: 2nd Strategic energy review (nov. 2008); ie, respectively 22% and 31% of electricity generation.
[5] Morocco, Algeria, Tunisia, Libya, Egypt, Jordan, Israel, Palestinian territories, Syria, Lebanon, Turkey
[6] and slightly more than 20% including hydro.

FIGURE 2: 21 PARTNERS OF MEDGRID

ANALYSIS

Lisa Guarera - OME

EGYPT ENERGY CHALLENGES

This article in an excerpt from the Mediterranean Energy Perspective - Egypt[1] energy study which is the first in a series of country studies – a specific in-depth analysis from the Mediterranean Energy Perspective (MEP) series. This study provides insights into the country's energy situation today and over the next two decades through 4 energy scenarios.

At the start of the second decade of the 21st century, Egypt faces a number of challenges and constraints to supply affordable energy to its people and to sustain rapid economic growth. Its economy is diversified with a significant energy sector, growing industry and service sectors and a projected robust growth for the next two decades. Egypt has the largest population in the Mediterranean region for which living standards and human development indicators have improved and are expected to continue to do so. Egypt needs large investments in the energy sector to meet the expected medium and long-term growth in energy demand. Private financing is likely to be necessary, which calls for continuing reforms to its energy markets.

EGYPT SCENARIOS AND MAIN ENERGY TRENDS

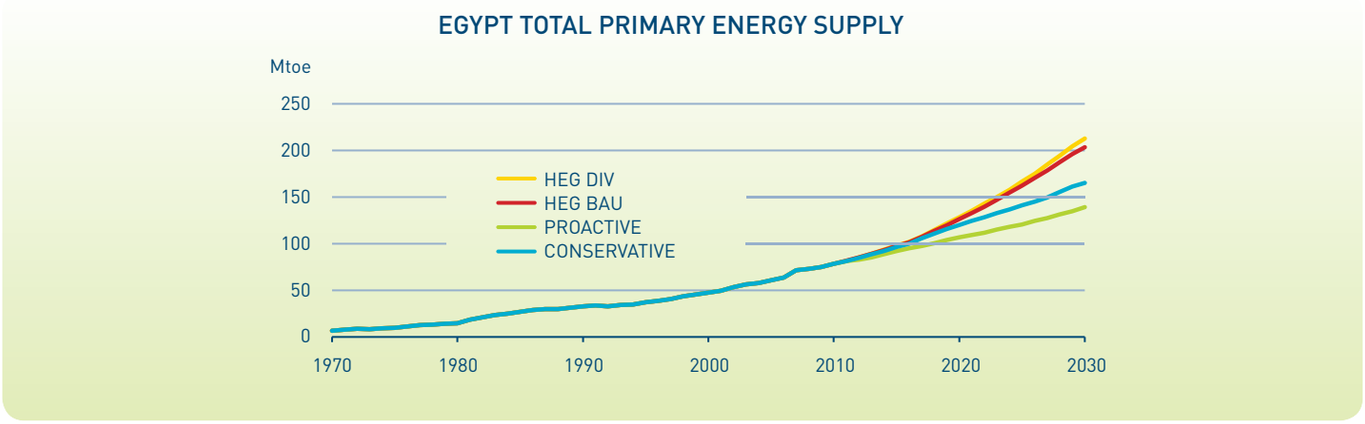
OME prepared and modelled two energy demand scenarios to 2030: a **Conservative Scenario** and a **Proactive Scenario**.

OME also prepared a **High Economic Growth Scenario** with two strategic variants based on the economic growth projections of the Egyptian Ministry of Economic Development.

The 4 scenarios represent 4 very different options for the country and would lead to a very different energy future:

- OME's Conservative (CS): presents a rather pessimistic approach that considers past trends, policies in force and ongoing projects but takes a more cautious approach regarding the implementation of policy measures and planned projects.
- HEG Business as Usual (HEG BAU): considers a higher economic growth rate estimated by the Egyptian Ministry of Economic Development and includes the electricity forecasts of Egypt Electricity Holding Company (EEHC) based on their planned power plant additions to 2030;
- HEG Diversification (HEG DIV): also considers the high economic growth estimated by the Egyptian Ministry of Economic Development and includes the targets given by the Egyptian Natural Gas Holding Company (EGAS) for power generation mix in 2030. This scenario is based on strategic choices (not driven by economics) to diversify the energy mix to other fuels and hence reduce heavy reliance on natural gas;
- OME's Proactive (PS): this scenario presents an approach to the energy future based on a radical improvement of energy efficiency and the encouragement of renewable energy. This scenario assumes that the necessary policy actions and measures to reduce energy intensity and to develop renewable and nuclear energy are implemented immediately.

[1] This report can be ordered at www.ome.org. At the time of writing this article the quantitative results for future trends were not final. Dates given in this article refer to fiscal years: 2008 = 2008/2009.



EGYPT'S ENERGY PROFILE IN A NUTSHELL

Egypt's energy sector is characterised by a number of distinctive features.
First, its hydrocarbon resources and the hydropower development of the Nile River have allowed Egypt to be largely energy self-sufficient for decades and, in fact, to be a net exporter, though the trade balance for oil is shifting to become a net importer.

Second, Egypt's geographic situation makes it a key transit route for oil and natural gas exports from the Middle East. It has the potential to play an important role in the further development of regional natural gas and electricity markets in North Africa and the Mediterranean.
Also related to its geography, Egypt is richly endowed with renewable energy opportunities with solar in vast areas of desert and world-class wind resources.

Another key feature is that the energy sector is dominated by the state: hydrocarbons are state-owned and controlled; electricity generation, transmission and distribution are in the hands of state-owned entities, although in the early 2000s three generation projects on a build-own-operate-transfer basis were developed by the private sector, but investments have stagnated since then. As its energy mix is mostly oil and gas, carbon dioxide from fuel combustion is Egypt's main source of greenhouse-gas emissions.

POPULATION GROWTH AND ECONOMIC DEVELOPMENT WILL DRIVE DEMAND HIGHER

The key drivers of energy demand in the outlook are a continuation of robust economic growth (from 4% to 6% per year on average) and a moderate rise in population.
Since 1970, energy demand has grown by about 6.5% per year, reaching 73 Mtoe in 2008. Egypt energy demand would increase to over 200 Mtoe in the HEG Diversification Scenario to around 140 Mtoe in the Proactive Scenario. Energy Demand in Egypt would double by 2030 and would nearly triple under higher economic growth scenarios.

Since the 1980s, three industrial sectors stand out as major energy consumers: iron and steel and the construction sub-sectors generally have a domestic focus whereas chemicals, in particular petrochemicals, have an export element. Today petrochemicals account for about 30% of total industry energy consumption and it is expected to see sustained growth in all scenarios to reach almost 50% of industrial energy demand in 2030. All scenarios also see continued growth in energy demand in construction in parallel with a large increase in residential buildings.

More people, more cars and a growing economy greatly boosted demand for oil products to fuel transport. The number of vehicles multiplied from 167 000 in 1970 to more than 5 million in 2010. It is expected to more than double by 2030.

In the early 1990s, the use of natural gas as a transport fuel was endorsed and the government encouraged the private sector to commercialise natural gas vehicles. It set a target to increase the number of natural gas vehicles to 300 000 by 2015. In 2030, oil will remain the primary fuel in the transport sector in all scenarios. While the use of natural gas for transport fuel will be a modest share of overall natural gas consumption, in absolute terms the increase is notable.

Egyptian households use energy for cooking, heating water, lighting, refrigeration and other appliances. Energy consumption for space heating, ventilation and air conditioning is much less prevalent. Per capita consumption in the residential sector is low by international comparison. This reflects relatively poor living comfort levels for large portions of the population. Yet, the electrification rate is close to 100% due to government actions over more than three decades, directed particularly at rural areas. A strong upward trend in energy consumption in the residential sector is expected as the number and size of dwellings get bigger, rising incomes bring lifestyle and comfort level changes and more people make use of modern energy services. This will have particular impact on the electricity sector both in terms of base supply and capacity to manage peak loads, which are currently stressing the system mainly in summertime season. Electricity demand is projected to increase more strongly than any other final form of energy.

ELECTRICITY: EGYPTIANS ARE PLUGGING IN MORE AND MORE

Egypt's electricity sector faces a number of challenges to meet growing demand. The most pressing issues include obtaining sufficient base and peak load capacity; ensuring

the availability of natural gas for power generation, at price levels that can be absorbed by the retail electricity tariff; implementing the government's ambitious renewable energy agenda; improving energy efficiency; and advancing reform of tariffs and subsidies.

Meeting peak load is an immediate challenge. Since 2008, consumption patterns have changed and households are connecting more and more electrical appliances, such as 2.3 million air conditioners in the last few years that are spiking peaks in load demand. It is also a long-term challenge as electricity demand expands as GDP grows and the low-to-moderate per capita levels rise to international levels.

Egypt's electricity generation was 131 terawatt-hours (TWh) in 2008. Electricity demand growth has been robust with annual average increases of 8.8% from 1980 to 1990 and 6% from 1990 to 2000, and then 7.7% per year. Annual electricity consumption rose from about 36 TWh in 1990 to 64 TWh in 2000 and then to 116 TWh in 2008. On a per capita basis, electricity consumption has risen significantly over the last three decades from 434 kWh in 1980 to 1 704 kWh in 2008, an average annual increase of 5.3%. This per capita consumption compares with an average in Africa of 571 kWh and globally of 2 782 kWh per person.

RENEWABLES: HARNESS THE WIND AND COLLECT THE RAYS

Egypt is richly endowed with renewable energy resources from solar insolation in the vast western desert, hydropower from the Nile River to world-class wind resources along the Gulf of Suez. There is enormous potential for renewable energy development in Egypt. Yet, today the contribution of renewable energy sources to total primary energy supply is fairly limited.

Traditionally biomass and hydropower have provided the largest share of renewable energy sources in Egypt. Developments in recent years have brought wind power into the mix. In 2008, renewables, including large hydro, accounted for 4% of the total primary energy supply. Today more than half of the renewables contribution to energy demand is electricity generation from hydro facilities. The other half is mostly traditional combustible biomass used in residential and industrial applications.

Renewables accounted for 13% of installed electricity generation capacity in 2008; about 90% was hydropower, most of the rest was wind power. The installation of wind turbines could push the capacity from 425 megawatts (MW) in 2008 to 7 332 MW in 2030 in the cautious scenarios. More ambitious scenarios envisage capacity additions to soar and exceed well over 20 GW of installed wind capacity by 2030 with a total share of renewables reaching 22.5% of the total energy mix in 2030.

HYDROCARBONS ARE A KEYSTONE OF EGYPT'S ECONOMY

Egypt is a significant oil producer, refiner and a rapidly growing natural gas producer. Notably, its strategic location is valuable for the Mediterranean region as well as global energy markets. Hydrocarbons are among the most important and strategic sectors in the country. Over time, their economic significance has increased, accounting for 15.6% of Egypt's gross domestic production in fiscal year 2008/2009. When the Suez Canal revenues are included, the total share of petroleum-related activities in national GDP is more than 18%.

After tourism revenues, petroleum exports and Suez Canal revenues are Egypt's main sources of foreign currency. In addition to its oil and gas export role, Egypt has international strategic importance with two transit routes that it operates. The Suez Canal is one of the world's most important marine routes, through which close to 10% of the international daily trade of crude oil, oil products and liquefied natural gas is transported. With the expansion of the Arab Gas Pipeline and liquefied natural gas facilities, Egypt will continue to be an important supplier to Europe and the Mediterranean region, and beyond.

Egypt has potential for additional hydrocarbon discoveries, as the country is still relatively under-explored. For natural gas, infrastructure is crucial. Egypt's proven oil reserves today are 4.4 billion barrels. Estimates for undiscovered oil reserves range from less than 1 billion to more than 5 billion barrels. Since 1975, Egypt's natural gas reserves have increased from 63 billion cubic metres (bcm) to nearly 2 200 bcm in 2010. More than 75% of gas reserves in Egypt are located in the Mediterranean region, followed by the Western Desert, Gulf of Suez and Nile Delta. Almost 90% of the natural gas reserves are non-associated gas, mostly in the Nile Delta and Mediterranean Sea areas.

Total oil production peaked in 1993 at about 924 000 barrels per day. It is on a declining trend. Today oil production is over 710 000 barrels per day, but this level will be sustained only for a few years. Production of crude oil & condensates is estimated to be slightly above 600 000 barrels per day in 2030. Since the start of commercial production in 1910, more than 10 billion barrels of oil have been produced. More than 75% of all crude oil and condensate produced were from fields in the Gulf of Suez and Sinai Peninsula, which currently hold over 40% of remaining oil reserves.
Natural gas production increased from just 0.08 bcm in 1975 to more than 66 bcm in 2010, a compound annual growth rate of almost 22%. During the same period, marketed volumes increased 23% per year. From first production in 1975 to June 2010, almost 700 bcm of natural gas have been produced in Egypt.

The main challenges facing Egypt's petroleum industry are adopting a sustainable upstream policy and encouraging efficient use of resources in an environment that currently is characterised by highly subsidised domestic prices and bureaucracy.

Fossil fuels are the driving force of Egypt's energy sector today and are expected to remain the dominant energy sources for the next two decades regardless of the scenario. Oil provides 46% and natural gas supplies 49% of primary energy to meet today's demands for economic activities and human needs. These shares remain high in the outlook scenarios with fossil fuels accounting for over 80% of primary demand by 2030 in all scenarios.

EGYPT HAS HUGE POTENTIAL FOR ENERGY EFFICIENCY GAINS

Egypt's abundance of energy resources and historically low energy prices have led to greater energy use on a per-capita basis than other countries at a similar stage of economic development. While it is a very broad aggregate measure, the ratio of energy consumption per unit of gross domestic product (energy intensity) experienced a 28% increase in Egypt from 1970 to 2007. Significant opportunities exist to moderate energy consumption and achieve reductions in greenhouse-gas emissions by improving efficiency and reducing losses.

There is very high potential for energy efficiency to be coupled with the use of renewable energy sources to provide more sustainable energy service to all sectors of Egypt's economy. Buildings use about 55% of Egypt's electricity production of which some 36% is in residences, 7% in commercial and 5% public establishments. A large part of the consumption is for lighting services and cooling loads. Intelligent construction of new buildings that employ proper orientation, efficient materials for the building envelope, ventilation control, use of natural light, and efficient lighting devices and appliances can reduce energy demand and improve comfort levels without major additional costs.

Energy efficiency is at the heart of Egypt's energy official strategy. However, the absence of a fully dedicated agency, the incipient level of co-ordination between the main stakeholders and the absence of mandatory targets are hindering effective energy efficiency developments.

ENVIRONMENT IMPACT

Energy-related emissions were responsible for more than 60% of Egypt's total greenhouse-gas emissions in 2008. The bulk of energy-related emissions (55%) are from fuel combustion. An important contributing factor in Egypt is related to the age of fossil fuel-fired combustion units and their combustion efficiency. Electricity generation is the largest greenhouse-gas emitter, being responsible for more than one-third of total CO_2 emissions. The industry and transport sectors each contribute about 25%. CO_2 emissions witnessed a nine-fold increase over the period 1970 to 2008.

The outlook for energy-related CO_2 emissions shows an upward trend in all Scenarios: 281 million tonnes of CO_2 in the Proactive Scenario and up to over 460 million tonnes of CO_2. Although in absolute values CO_2 emissions in the Proactive Scenario are much lower than any other scenario, they would still be 1.6 times higher than CO_2 emission levels in 2008.

Egypt faces challenges on many fronts to advance economic growth and social development in a manner that ensures environmental integrity. The consequences of energy production and use in all sectors are chief among environmental concerns in Egypt. They range from the potential of using desert lands to grow crops to produce biofuels to air pollution from low-efficiency engines using hydrocarbon fuels and to demands on scare water resources.

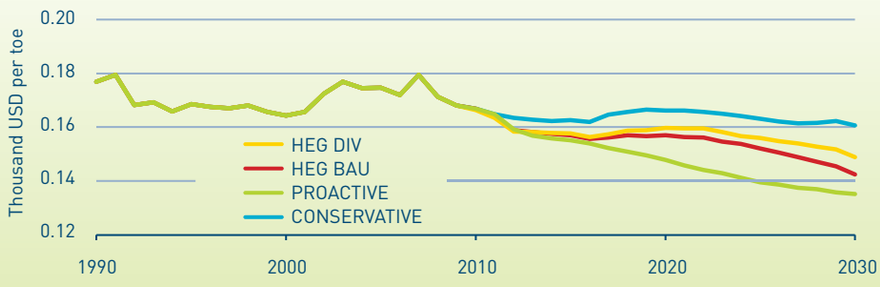
Water and energy are interlinked. Producing energy uses water, and providing freshwater uses energy. Both these processes face growing limits and problems. Water scarcity is a critical environmental problem in Egypt. It is affecting the country's path toward sustainable development. The challenges of growth in population, agricultural and industrial activities are stretching the limits of the available supply. In addition to the water deficit, the demand levels are producing severe pollution of both surface and groundwater resources. Scarcity of fresh water will drive the need for desalinated water hence the need for additional energy to fuel the process.

CONCLUSION

Regardless of the economic path, Egypt is definitely at a crossroad in its energy choices and strategy. Energy demand in Egypt is set to increase substantially in the coming decades. The path it will embark on in the coming years will lead to trends in energy demand and production which will bear consequences on the whole outlook of the country and also of the region to 2030 and beyond.

OME's Mediterranean Energy Perspectives - Egypt is a comprehensive review of the past, present and possible future of the energy sector in this ancient land that is a crossroads in the Mediterranean region. This report is filled with data, figures, tables and analysis that stretch some 400 pages and represents the input from numerous experts. Perhaps, you, the reader, are only interested in one or two elements of a particular energy sector or only want to get a sense of the state of wind power in Egypt, the weight of subsidies and tariffs, or rather want an in-depth review of the stratigraphy of the Nile Delta. Regardless, this study will be of value to you to provide a context for coming to better understand the energy profile of Egypt.

EGYPT ENERGY INTENSITY BY SCENARIO



ANALYSIS

Bruno Castellano and Sohbet Karbuz - OME

A BRIEF ANALYSIS OF EU'S VULNERABILITY TO OIL SUPPLY RISKS[1]

INTRODUCTION

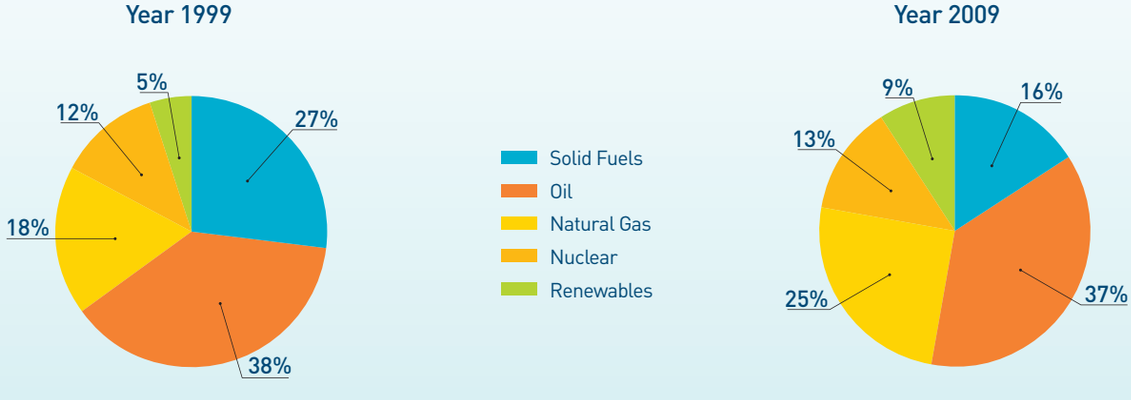
For more than a hundred years, oil has been a key driver of the world economy. Unlike coal and gas markets, the oil market is global and is still the predominant source of energy in the world. Its several characteristics, such as ease of transport, storage as well as lack of a profitable alternative to substitute its multiple purposes (transportation, heating, power generation, plastics, etc) have contributed to its wide use. These characteristics, along with its extensive utilization, make oil an important element in many geopolitical crises.

Since 1981 more oil is consumed each year globally than is discovered[2]. Moreover, oil resources and production have started to concentrate on fewer countries. Meanwhile, many of today's advanced economies, which were once large oil producers, have become net importers. Consequently, oil trade and dependency have started to increase. Increasing trade and reliance on foreign oil of more countries have brought about the issue of vulnerability because of supply disruptions. This, in essence, highlights the importance of security of supply for a sustained energy future for consuming countries.

Despite the significant increase and penetration of natural gas and renewables into the EU energy system in the last two decades, share of oil in primary energy demand remained the largest and more or less constant at about 37-38%.

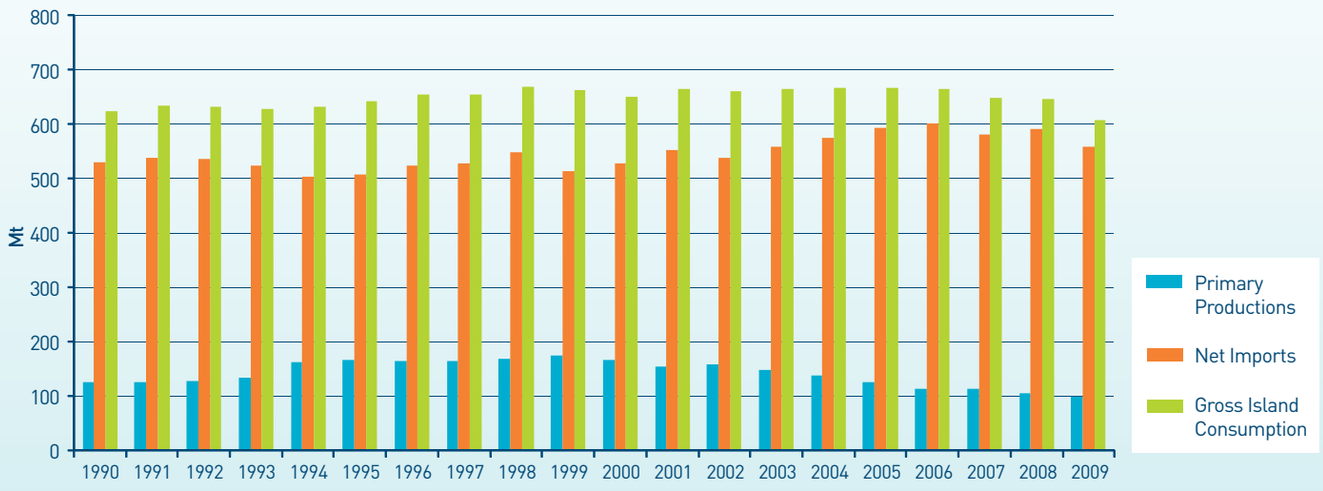
The issue at stake is that despite the nearly stagnant oil demand in the EU, net imports have started to increase since 1999 and reached almost 600 million tons (Mt) in 2008, before dropping in 2009 because of global economic

FIGURE 1: PRIMARY ENERGY CONSUMPTION BY FUEL IN EU-27



Source: OME, based on Eurostat data.

FIGURE 2: PRODUCTION, NET IMPORTS AND CONSUMPTION OF OIL IN THE EU

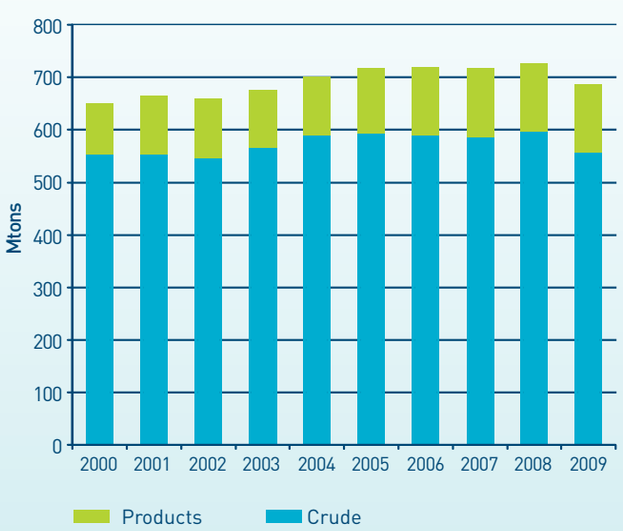


Source: OME, based on Eurostat data.

turmoil. This is due to the fact that domestic oil production in the EU reached its peak in that year and has been declining since then. According to the latest EC forecasts released in September 2010, net oil imports will remain at around 600 Mt over the next two decades. This means that oil import dependency of the EU is and will remain over 90%.

Over 80 percent of EU's gross oil imports is crude oil. The remainder is oil products. Russia, Norway and North Africa account for more than half of EU's total gross oil imports of around 700 Mt. In the last two years, share of Russia in that total was about 30% while shares of Norway and North Africa were 13% each.

FIGURE 3: TOTAL EXTRA-EU27 GROSS OIL IMPORTS



Source: OME, based on Eurostat data.

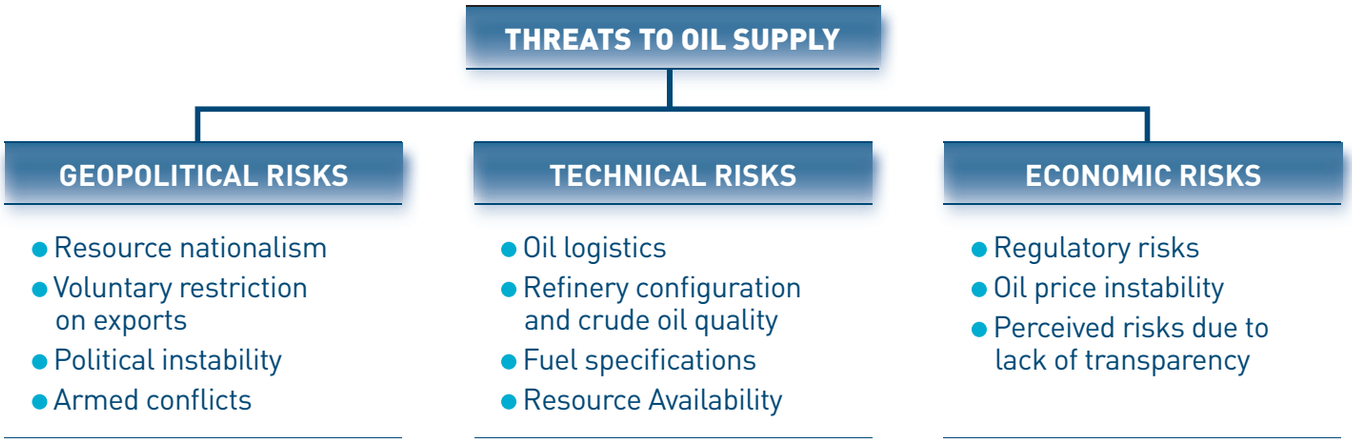
POTENTIAL THREATS TO OIL SUPPLIES AND THEIR IMPACT ON THE EU ENERGY SYSTEM

Identification of threats and their impact to the oil supply system is essential for the (EU) oil supply security. Potential threats can be grouped into three categories: geopolitical, technical and economic risks. For each category, threat to energy security can take different forms.

It is generally understood and accepted that geopolitical factors may negatively impact oil supplies. Nevertheless, with regards to resource nationalism and political instability, it was shown that there is no easy and immediate connection between those elements and global supply of oil. They have rarely been associated with severe supply crises or shortfalls in the past. Their effect is normally compensated by action in other parts of the system.

Resource nationalism can be seen as a market relationship between producers and consumers, trying to maximize their share of the rent. Today, the system appears quite flexible and capable of withstanding even important shocks, primarily thanks to excess capacity available in Saudi Arabia. However, it is not guaranteed that this excess capacity will still be available tomorrow. If severe political problems affect Saudi Arabia, this might have adverse repercussions on global oil supply security even today.

Similarly, oil and gas installations appear to be much more resilient to armed conflict than is normally acknowledged. However, it is obvious that governments' inability to



overcome or absorb violent opposition discourages international oil company investments even if the violence does not affect the vicinity of oil installations.

Arguably, the most important and credible maximum physical shock to oil supply can arise due to closure of strategic oil transport passages (or chokepoints). Distribution is a fundamental factor to the supply-demand equilibrium, and therefore delivering oil is as important as producing and pricing it[3].

Oil is a strategic commodity traded globally. Around half of world oil production is transported by tankers on maritime routes. Not only are numerous chokepoints are in close proximity to politically unstable nations but they may limit the potential growth of the oil circulation capacity[4]. These geographical constraints are difficult to go around and should be seen as a significant vulnerability factor.

The challenges of delivering oil from the producing areas to the consuming ones include future oil shortages, either voluntary (terrorism, sabotage) or involuntary (accidents). Therefore, threats to logistics at chokepoints and in the high seas (piracy or accidents) have been of a major concern. Today, maritime logistics are unlikely to generate major crises, but require constant attention, and hence patrolling and surveillance of maritime traffic is essential. Amplified piracy threat, for instance, could translate in the future into increased transportation costs –more costly insurance, premiums to be paid to crew members, time lost and ransom to be paid[5].

The unsatisfactory functioning of the international oil market is another threat that affects energy security. The fundamental unpredictability of oil prices is a major obstacle to security of oil supply. Besides, high oil price volatility distorts the real signal needed by corporate decision makers for the purpose of sanctioning long term investment.

An investment decision for future oil flows takes many years, mostly more than a decade, to be realized on the ground. The investments of today are the resources of tomorrow and hence rising prices are not necessarily a bad news. They may help stimulating investment in additional sources of conventional oil, developing non-conventional resources, and possibly promoting alternative energy sources. However, not investing enough in a timely manner could be seen as a threat to supply and demand balance in middle to long term.

Increasing expectations about the likelihood of a supply crunch in the near future, on the grounds that world oil production will increasingly struggle to meet demand, cannot be overlooked. A tight market will result in higher prices. How much these price hikes will be able to dent world oil demand, if ever, or will push for the alternatives or unconventional forms is extremely difficult to predict.

On the downstream side, the European refining industry faces major challenges. In the longer term there is an inevitable trend toward heavier and sourer crudes which would require considerable investment in refineries, particularly those in North Western Europe. This would also require the use of more energy input to process the heavy crude, hence increasing the amount of CO_2 released into the atmosphere and so the costs.

There is also an identifiable and clear shift in the products demanded by the European market, which has principally been characterized by increased demand for diesel and kerosene and reduced demand for gasoline. These fuels are essential for mobility, and subsequently the impact of disruption to such supply would be considerable. Although gasoline supply from Europe has identifiable markets, there are serious questions about the future viability of European gasoline exports. In addition, unless significant money is invested in the upgrading of refineries to produce more middle distillates or gasoline production is rationalized, refinery closures may become inevitable.

Another challenge facing the refining industry is to meet the strict regulatory requirements that have been set on a frequent basis. Such modifications are immensely costly, and make investment conditions within Europe challenging. The combination of tougher product specifications, particularly the newly adopted international regulations on marine fuels, and the increase of the middle distillates over

gasoline has led to a need for extensive investment in the refining industry. CONCAWE refinery technology support group has estimated the potential cost at 41 billion euros if the European refining industry is to keep pace with product specification changes and the changes in demand[6].

When we look at vulnerability to crude oil supply versus vulnerability to refined products supply tradeoff, importing refined products at the expense of crude seems to further diminish security of supply in Europe. Favoring a policy for importing refined products more instead of crude would give Europe less diversification in the areas it could import from.

Lastly, emission trading system may have negative impact on the refining industry. Added costs combined with increased competition from markets not subject to such schemes such as the Middle East and India could result in further diminishing of the profitability of European refineries compared to their foreign competitors, thereby resulting in the closure of less profitable European refineries penalized by carbon costs. The essential dilemma that European refiners presently face is whether to continue to invest significant amounts of money in unprofitable environmental improvements or sell the existing refineries.

Probability and consequences of an interruption

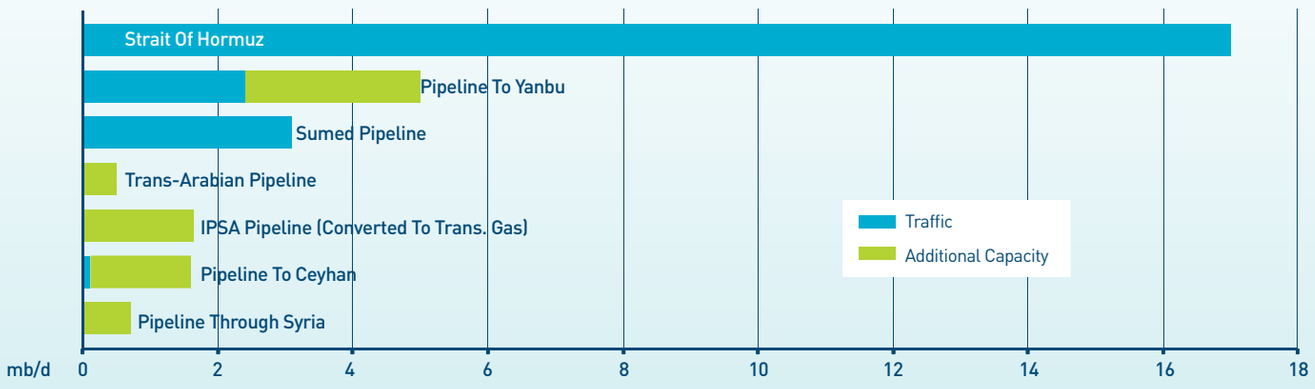
Global oil supply security caused increasing anxiety following the 1973 OAPEC (Organization of Arab Petroleum Exporting Countries) embargo. The EU did not suffer during the oil crises in the past thanks to large domestic production in the North Sea. Now, however, the situation is different. Oil production in the North Sea and elsewhere in the EU is declining. Therefore, the EU is more vulnerable to oil supply cuts today compared to the past.

Most oil supply disruptions in the past have been the result of geopolitical and technical incidents. None of the disruptions has lasted more than a year. In most cases the market absorbed net loss of oil and adjusted by efficiently redistributing flows. No country experienced a significant lack of oil as a unique result of deliberate action. Significant price increases occurred, however, following large disruptions that were the results of large suppliers' coordinated action.

Threat to EU oil supply security attracted considerable attention after the short disruption of Russian oil to Belarus at the beginning of 2007. In theory, a sustained disruption of oil supplies could cause severe and perhaps long lasting damage to the economies of affected importing countries. The question is whether such a situation may happen and what its likely impact is.

Because of the nature of world oil markets and oil itself (being a fungible commodity), a supply cut to a specific country is highly implausible. For a cut to have a damaging consequence, it must be large scale. However, such a cut would damage not only the economy of consumer countries but also producer countries, due to loss of revenue. Therefore, it is important to understand the nature and motivation of disruptions.

FIGURE 4: ALTERNATE ROUTES TO PERSIAN GULF OIL EXPORTS



Source: OME, based on Oil & Gas Journal EIA data.

Local unrest, geopolitical instability, extreme weather events, and terrorist actions against critical energy infrastructure are risks that have always caused anxiety. Some could be foreseen and some not. The same can be said for today. It is not possible to quantify the probability of these rather short lived events to take place in the future.

Even the closure of the Strait of Hormuz, which might be considered as worst scenario, would not probably have the disastrous consequences as argued by the media. The consensus among experts is that it would be very difficult to close the Strait of Hormuz, even partially, and even more difficult, perhaps impossible, to maintain that closure for a long period of time. Although about 16.5-17 million barrels per day (mb/d) of oil is exported by Persian/Arabian Gulf countries via the Strait of Hormuz, mitigation measures exist.

About 9 mb/d of oil pipeline capacity exist in the region and only a small portion is used. IEA Member countries, through their emergency response system, could replace up to 4 mb/d of oil supply for one year, and possibly more on a shorter term. Another mitigation measure would be to increase delivery of oil to loading terminals outside of the Gulf; UAE and Saudi Arabia have ports respectively on the Indian Ocean and the Red Sea.

In the case of a brief (and partial) disruption of the traffic through the strait, consequences would most probably be limited to a rise of energy prices (including LNG prices from Qatar) and so do maritime insurance premiums. Still, investment to reduce pressure on key choke points is essential. In addition, investment to reduce traffic in enclosed seas is highly advisable.

CONCLUDING REMARKS

Energy diversification is and should remain a key tool in European's energy policy to reduce its vulnerability to security of supply. But European states need also to speak as one voice on the international scene. Energy policy should no longer be considered a matter of national sovereignty if European countries want to strengthen their position with their export partners and compete on an equal base with other major importing economies.

Security of supply and security of demand are the two faces of the same coin, and the idea of energy interdependency between countries should take over ahead the idea of energy dependency. For several years, exporting countries request from importing countries a road map on demand. An evolution towards take or pay contracts like the one in place in the gas industry could be envisaged. It would give large producers significant demand certainty and encourage them to engage in the investment needed to meet expected future demand. Dialogue between producing and consuming countries should be strengthened.

Looking further to the future of the downstream sector, a more fundamental balance is needed between ensuring security of supply and meeting energy-climate targets. European refiners have to address the structural imbalance that presently exists between diesel and gasoline, and the EU needs to provide incentives to make the right investments. Several mitigation measures like the international alignment of products standards, standardization at EU level of environmental measures and rules, promotion of R&D activities and innovative solutions for crude processes to increase middle distillates production, greater coordination between industry and legislators, and the reduction of differential in taxation, could help EU secure its supply of refined products. The challenges that face the refining industry must be turned into opportunities. If inaction and uncertainty prevail, then

Europe will most likely increase its reliance on imports to the detriment of security of supply.

There is no doubt that unconventional oil resources will play an important role in the future since there are immense in-place resources even though their fluid quality is poor, recovery rates are lower than the conventional oil, and they put pressure on water and to some extend natural gas supplies. Nevertheless, conventional crude oil is no longer the only source of liquid fuels. Most unconventional oil projects are more predictable in terms of timing or production profile. Advances in technology (improved recovery rates, deep off-shore, gas-, biomass-, or coal- to liquids) will also help, but how much and how fast is yet to be seen. The question remains whether we can mitigate, in relatively short time, the impact of reduced readily available resources, and the adverse effects of peak oil taking place much earlier than expected.

Extreme price fluctuations are and will remain a concern for all. Efforts to reduce short term volatility and achieve greater reliability of oil prices should be encouraged. And this requires more transparency in the market.

Demand restraint policies in the transport sector should be a priority for the EU to go after. Because of (or thanks to) the financial crisis, several European countries supported replacement of the car fleet through incentives. However, the objective should not only be reducing the CO_2 emissions but also improving oil consumption patterns and behavior. Investments in research and development, innovation, and promoting incentives for the market uptake of new technologies, including hybrid and electric cars, should be further encouraged. Fostering public transport, right biofuels, developing congestion charges are other instruments to reduce EU dependency on oil.

Ability of the EU to address those challenges would be essential. For the mutual benefits of all, issues on security of supply will need to be combated collectively through a coordinated effort involving all stakeholders.

1 This article integrates some of the findings of the EC's SECURE project carried out by a consortium of 15 major European researc institutions, with OME being the overall coordinator
2 Amarch Consulting & Robert Hirsch, Ireland's Oil Dependence: Trends, Prospects & Opinions, February 2006.
3 Jean Paul Rodrigue, Straits, Passages and Chokepoints, A Maritime Geostrategy of Petroleum Distribution, Cahiers de Géographie du Québec, December 2004.
4 Moreover, it would be difficult to envisage additional economies of scale in maritime shipping due to terminal access and to some extent to the size of ships.
5 See, Roger Middleton, 'Piracy in Somalia,' Chatham House briefing paper, October 2008.
6 CONCAWE, Impact of product quality and demand evolution on EU refineries at the 2020 horizon, 2008.

ANALYSIS

Denis Hess - OME

RENEWABLE ENERGIES IN GERMANY - PAST AND TODAY

STATUS AND PERSPECTIVES

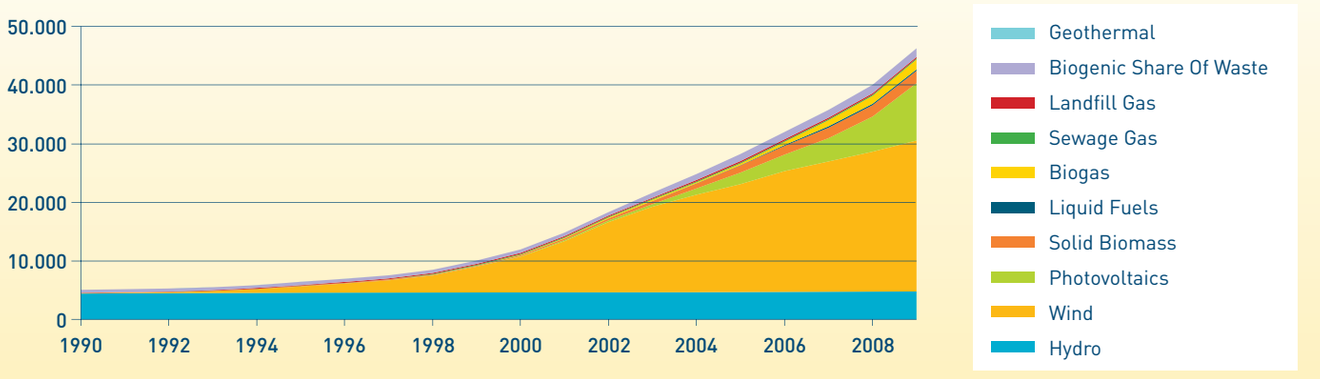
The expansion of renewable energy sources in Germany has been an exemplary success. In many regions of the world, energy demand is increasing rapidly as a result of fast development. At the same time, industrialized countries have an obligation to drastically **lower their resource consumption and energy-related greenhouse gas emissions.** Only with such reductions we will still be able to **prevent the worst impacts of climate change and reduce dependencies on resources.** Since 2000, renewable energies' contribution to final energy supply in Germany has increased 2.5-fold to a level of 10.3 %. In the electricity sector, the German Government had originally aimed at a 12.5 % renewables' share of gross electricity demand by 2010. This target was already surpassed considerably by 2007. **In 2009, a share of over 16 % had been reached.**

The most important factor in the successful expansion of renewable energies in the electricity sector is the Renewable Energy Sources Act (EEG). The Act outlines a path for further expansion: renewable energy is to account for at least 30% of electricity provision by 2020. On 1 January 2009, the Act on the Promotion of Renewable Energies in the Heat Sector (EEWärmeG) also entered into force. It specifies that the renewable energies' share of heat supply is to reach 14% by 2020. In addition, under a "Biomass Action Plan," by 2020 the biofuels' share of fuel use is to be increased to a level that yields a greenhouse gas emissions reduction of 7%. This corresponds to an energy share of about 12%.

CURRENT ENERGY STRUCTURE AND FUTURE RISKS

The energy consumption in Germany is based largely on fossil fuels: oil, coal and gas. These are all projected in the foreseeable future to account for the bulk of energy supply. But they are (nuclear power included) a finite resource. As a result of the increasing exploitation of these energy sources, cost increases in the coming decades are expected. Because of their consumption and higher costs, the scope of action of future generations will be constricted.

INSTALLED CAPACITY FOR ELECTRICITY GENERATION FROM RENEWABLE ENERGIES (MW)



Source: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

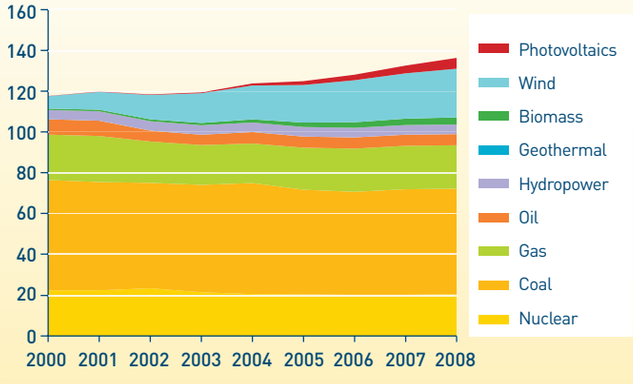
Renewable energy impact and lessons learned

- Renewable energies make a key contribution to climate protection, for example, by replacing fossil fuels - in 2008 they prevented the emission of ca 109 million tonnes of the greenhouse gas CO_2 in Germany alone, i.e. 15 % of the total CO_2 emissions in Germany.
- They increase resource diversity and reduce dependence on imports of fossil fuels. Thus they enhance supply security and help prevent resource-related conflicts.
- Renewables also protect against incalculable increases in the cost of energy imports, which are inevitable, of fossil and nuclear resources in the medium and long term, and already apparent in the case of oil.
- At the end of their useful life, facilities for the use of renewable energy sources are easily dismantled and recycled. They leave no long-term pollution behind or damage such as radioactive waste or coal-mining pits.
- In most cases, renewable energies are locally available energy resources and are often domestic energy carriers, which contribute to regional added value and secure employment. In 2009, investments totaling 20 billion Euros were made in Germany's renewable energies sector, and operation of renewable energy facilities generated about 16 billion Euros of value added. With domestic revenue totaling about 36 billion Euros, the sector was not highly affected by the economic crisis. In 2009 its workforce amounted to over 300.000 people.
- From a developmental perspective, renewable energies are easier accessible for large population groups, by new rural electrification in developing countries. They can help lead these countries out of poverty.

Source: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

Another risk of the present energy structure are energy-related worldwide carbon dioxide emissions, which are responsible for more than 70 percent of human-induced greenhouse effects (in Germany even 87 percent). Combustion of fossil fuels also generates air pollutants such as sulfur dioxide and nitrogen oxides that contribute to the formation of acid rain. In addition, carbon monoxide, unburned hydrocarbons, soot and dust are emitted. Also, water pollution and water consumption are fossil fuels combustion related issues. In this respect, the current energy consumption is at the expense of future generations, that will be confronted with pollution, negative effects on human health and the consequences of climate change. Therefore, the challenge is to prevent these negative effects and enforce a renewable energy structure which yields **inter-generation fairness, security supply and cost effectiveness.**

ACHIEVED CAPACITY (GW) IN GERMANY



MEASURES TO PROMOTE RENEWABLE ENERGY

Besides the technical, legal and organizational prerequisites favorable economic conditions are necessary. Within a few years some renewable energy sources e.g. photovoltaic and wind turbines will become more cost favorable than many conventional resources. However, until then, the state is called upon to create supportive conditions. In this way, the cost reduction potential can be quickly exploited through "market learning," and the subsidies can be reduced successively until renewable energy has achieved widespread competitiveness.

The German Federal Government supports the market development in renewable energy with several different measures. The most important instruments are:

- *the Renewable Energy Sources Act for the electricity market*
- *guaranteeing fixed compensation for the generation of environmentally friendly electricity, to be paid by the power grid operators and so by consumers;*
- *the federal market incentive programme and the Renewable Heat Sources Act for the heat market;*
- *and the Biofuel Quota Act for the fuel market.*

RENEWABLE ENERGY SOURCES ACT IN ELECTRICITY

A particularly effective example is the **Renewable Energy Sources Act** (EEG), which came into effect in 2000 following the Electricity Feed-In Act (StrEG) from 1991. As a result of the EEG, the generation of electricity from renewable sources has more than tripled from 30 billion kWh in 1999 to over 90 billion kWh in 2008. The EEG has become **Germany's most effective instrument for climate protection.**

Short evolutionary history of the first Renewable Energy Act

In 1990 the first feed-in law was designed by Matthias Engelsberger a member of the German parliament. Although this law doesn't exist anymore, but it was the beginning of an extraordinary success story. As a basis for the Renewable Energy Act (EEG), it sets international standards for the promotion of green electricity.

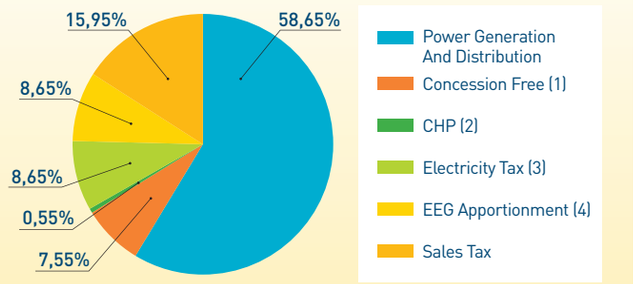
Engelsberger represented the Association of Bavarian hydropower plants. He negotiated the prices, which should be paid by the system operator for electricity from hydropower. The power companies bargained relentlessly to minimize amounts. Engelsberger felt treated unfairly. Even before the turn of the 20th century, the power plant, which then belonged to his father, supplied a small town with electricity. But the major energy related issues of those days were coal-fired electricity generation and nuclear power. Hydroelectric power was scarcely noticed.

What are 50 million Mark (25 mio. €), which cost the law in the first year, compared to the billions that are made in the energy industry?

Engelsberger managed to convince parliament and that same year the law was passed and became effective on 1 January 1991 as the "Electricity Feed-In Act." The electricity suppliers were allowed to apportion the costs to the consumers. Every kilowatt hour of green electricity that flowed into the grid was paid with at least 65% and from wind and solar energy 90% of the average revenue per kilowatt-hour from the current distribution of the electricity supply companies to all final consumers.

Source: DIE ZEIT

COMPOSITION OF ELECTRICITY PRICE 2010



Source: Bundesverband der Energie- und Wasserwirtschaft (BDEW)

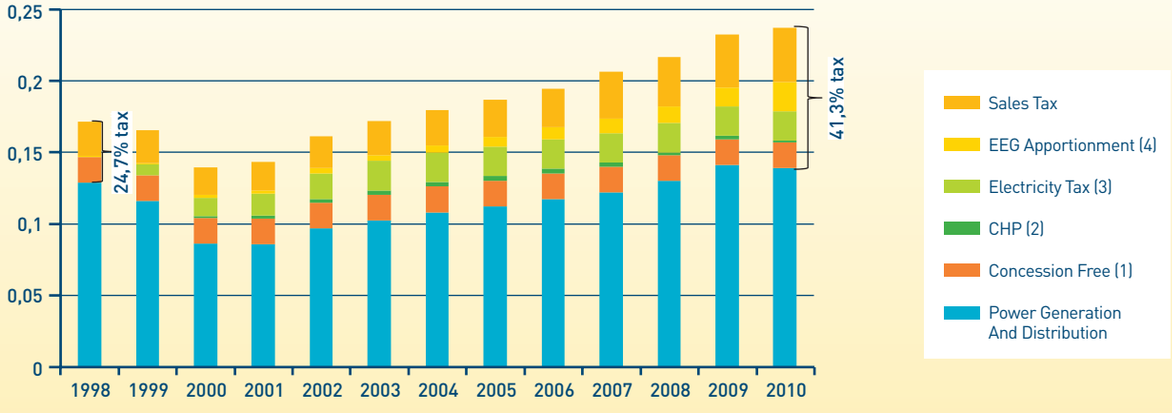
FORMULA FOR SUCCESS

In the mean time, many other countries are employing instruments similar to the German EEG to promote renewable energy – the instrument itself has become a top export, along with wind and solar technology. Three components define the recipe for this law's success:

- the connection of all renewable energy systems to the power grid is guaranteed,
- the purchase and distribution of the electricity generated by these systems is guaranteed,
- fixed compensation tariffs for the fed-in electricity are specified for each type of renewable energy, and generally guaranteed for 20 years.

The EEG obliges the power companies to include renewable electricity in their portfolio, even though it is more expensive. These additional costs are apportioned to all electricity consumers. This contribution not only reduces the dependency on imports and greenhouse gas emissions, but also protects from unexpected future price increases of fossil energy carriers.

AVERAGE ELECTRICITY PRICES FOR A GERMAN 3-PERSON HOUSEHOLD WITH ANNUAL CONSUMPTION OF 3500 kWh (€/ kWh)

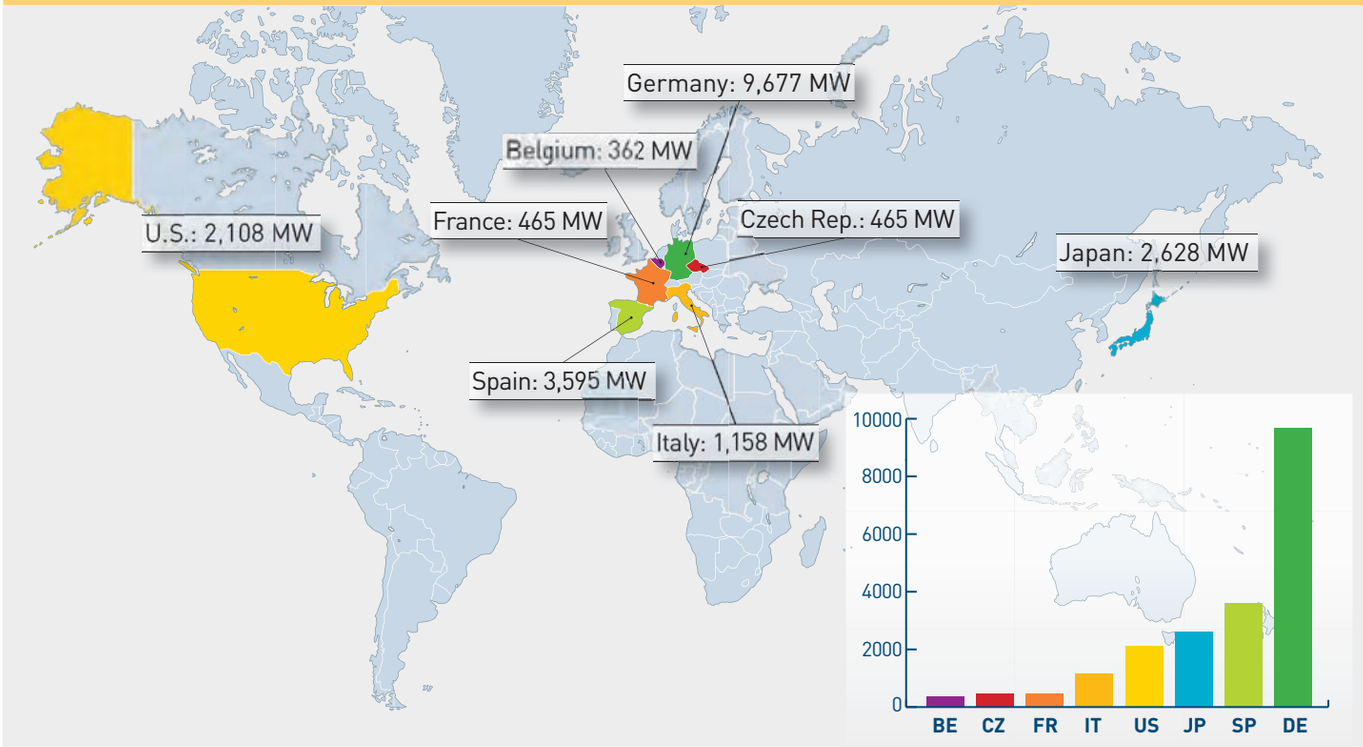


Source: Bundesverband der Energie- und Wasserwirtschaft (BDEW)

(1) Concession fee, as payment in return for granting of rights of way by local communities to install pipelines to the consumer
(2) Combined heat and power (CHP) to promote electricity from plants with combined heat and power
(3) Electricity tax (eco-tax) to promote climate-policy objectives, and to reduce and stabilize the pension contribution rate
(4) EEG apportionment according to the Renewable Energies Act (EEG) to promote energy production from renewable energy sources

EXAMPLE OF PHOTOVOLTAIC DEVELOPMENT

Top eight countries with photovoltaic installed capacity in 2009

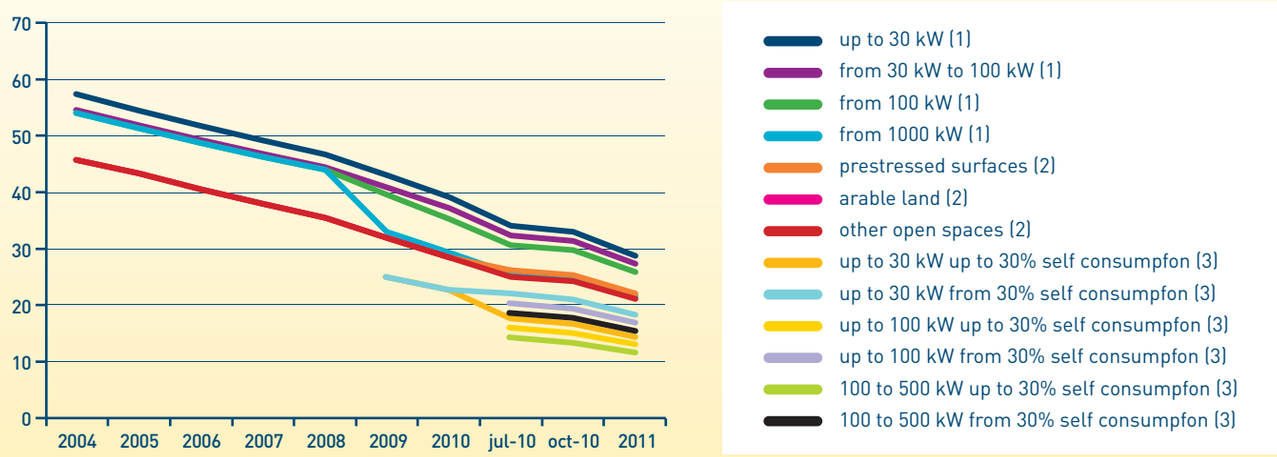


Source: EERE, 2009 Renewable Energy Data Book

The feed-in tariff depends on the year of commissioning and remains constant over 20 years. According to performance different standards for application are used. In a roof system built in 2009 with a peak power of 40 kW, the first 30 kW will be paid with a feed-in tariff of 43.01 cents/kWh - for the remaining 10 kW, there is a feed-in tariff of 40.91 cents/kWh – until the end of 2029.

Through the Renewable Energy Sources Act, the operator of a renewable energy system receives a fixed compensation from the electricity company for every kilowatt hour of electricity fed into the grid.

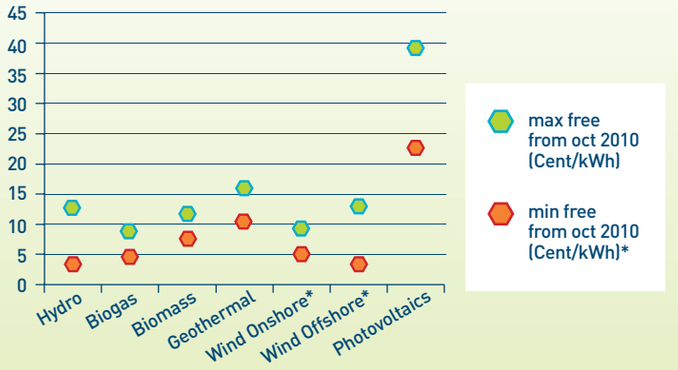
FEED-IN TARIFFS OF PHOTOVOLTAICS [ct/kWh] AND PLANT TYPES



Source: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

(1) On a building or a noise barrier
(2) Open areas (not performance-linked)
(3) Compensation for self-consumption systems on buildings

FEED-IN TARIFF [cents/kWh] OF DIFERENT PLANT TYPES



Source: BMU

TOP FOUR REGIONAL POWER OPERATORS

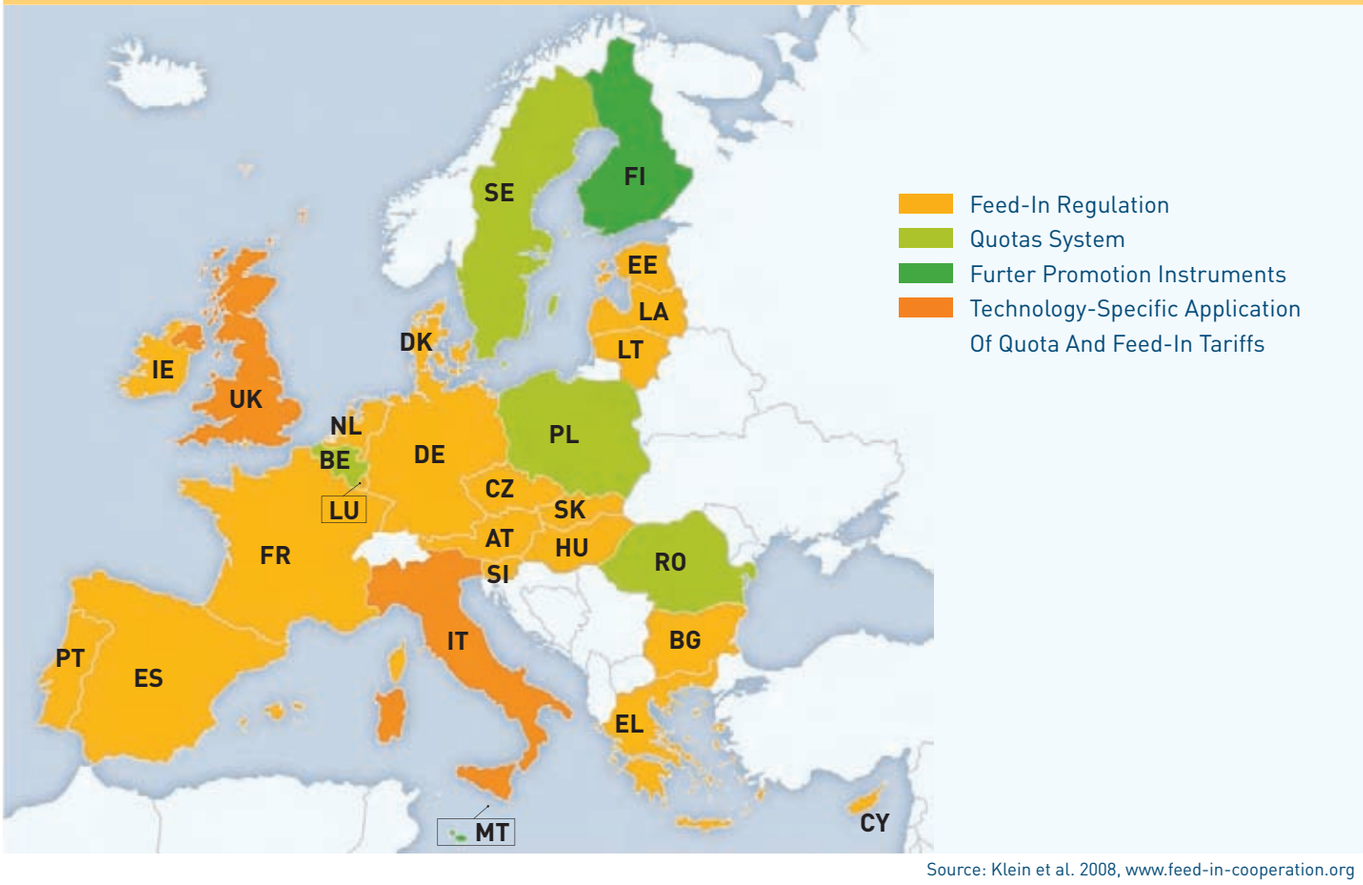
Source: BDEW

There are also other models for promoting renewable electricity – like a quota model which, instead of its price, specifies the amount of renewable electricity that must be generated:

In a quota model the electricity company is obliged to include a certain amount of renewable energy, which they can either produce themselves or purchase from operators of wind, biomass, or solar power stations at the lowest price. This induces a competition for the lowest electricity price, making it difficult especially for small-and medium-sized investors in renewable energy to estimate their returns. As a consequence which in turn slows the politically desired expansion of renewable energy slowed down.

If the energy companies do not reach the prescribed quotas, then they must purchase so-called green electricity certificates on the renewable electricity market or pay a penalty. Several East-European countries employ this mixed quota and certificate model. Over the past few years, many studies and reports, e.g. by the European Commission or the International Energy Agency, have proven that well-designed **electricity feed-in regulations** like the EEG are **much more effective than quota regulations.** The feed-in regulations lead to a faster and more extensive expansion of renewable energy and are therfore cheaper for the consumer. About 50 countries around the world have implemented an instrument similar to the EEG.

EU COUNTRIES WITH STATE MEASUREMENTS FOR RENEWABLE ENERGIES



Source: Klein et al. 2008, www.feed-in-cooperation.org

The planning and investment security created by the EEG is fundamental for the law's success – especially for the middle class. Examples from many countries all over the world show that fixed feed-in tariffs are considerably more successful at promoting the market introduction of renewable energy systems than quantity regulations with auctions or certificate trade. This security is decisive for banks and credit institutions deciding on the allocation of loans for investments in renewable energy systems.

WHAT IS THE GERMAN FEDERAL GOVERNMENT DOING FOR RENEWABLE ENERGY? –selected measures for market development

- The Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) has proven to be an extremely successful instrument – also in international comparison – for expanding renewable energy in the electricity market. Not only are the national goals being met, but also the European guidelines for the promotion of electricity generation from renewable energy from 2001. The EEG guarantees operators of renewable energy systems priority for feeding their electricity into the grid and payment at a fixed reimbursement rate over an assured period of time (usually 20 years). This arrangement provides investment security. The reimbursement payments are apportioned to all electricity consumers through a national equalisation mechanism, which also disencumbers power-intensive companies so that they do not suffer any competitive disadvantages. The degression of the reimbursement rates for future systems provides an incentive for innovations and cost reductions. Thus renewable energy sources are quickly guided to a competitive state.

- The Renewable Energies Heat Act (Erneuerbare Energien Wärmegesetz) obliges owners of newly constructed buildings to meet a specified share of their heat requirement using renewable energy. Alternatively, the house can be particularly well insulated, connected to a local heat grid, or be supplied by a combined heat and power system.

- The market incentive programme to promote renewable energy primarily supports the construction of systems to generate heat from renewable energy sources. It is the largest subsidy programme of its kind in Europe, with a volume of ca 400 million Euros per year. Smaller systems are supported by a subsidy from the Federal Agency for Economy and Exports (Bundesamt für Wirtschaft und Ausfuhrkontrolle, www.bafa.de). Larger systems can be financed through special loan programmes handled by the Reconstruction Loan Corporation (Kreditanstalt für Wiederaufbau, KfW).

- The transportation sector is accessed by reducing the mineral oil tax for pure biofuels. Furthermore, a bio-fuel quota specifies the amount of biofuel which must be admixed to diesel and gasoline fuels. In 2009, 5.25% of the fuel energetic content must come from biofuels, increasing to 6.25% in 2010. Starting from 2015 this admixture obligation will be converted from a quota to a net contribution to the reduction of greenhouse gases. By this way, the greenhouse gases emitted by the production of biofuels will also be considered. Biofuels with lower greenhouse gas emissions will figure stronger in the quota.

The German government provides numerous publications on all topics regarding renewable energy through its technical information and public relations work. An overview is available on the German Federal Environment Ministry's topic webpage: **www.erneuerbare-energien.de**

Projects with German cooperation in the Mediterranean region

- DESERTEC will use solar-thermal power plants in Earth's sun belt to generate climate-friendly electricity for Europe, the Middle East and North Africa. It has set a long-term goal of supplying 15 per cent of Europe's electricity by 2050 from its solar and wind power plants.
- Solar MED Atlas: provides a database of available solar resource in direct and global radiation in the Mediterranean. Partners: DLR (General coordinator, Germany), Armines and Tranvalor (France), JRC (EU), GeoModel (SK), Unep, OME, RCREEE. The project is funded by German Climate Initiative, by the Ministries of Environment and economic development.
- The Mediterranean Solar Plan aims at creating 20 gigawatts' worth of new renewable energy by 2020 – the equivalent of around 15 coal-fired power plants; promoted by Federal Ministry for the Environment, Nuclear Safety and Nature Conservation, Mediterranean Association of National Energy Agencies (MEDENER) and in close co-operation with key partners and initiatives such as the Mediterranean Energy Observatory (OME), the Regional Centre for Renewable Energies and Energy Efficiency (RCREEE) in Cairo and the Mediterranean Renewable Energy Centre (MEDREC) in Tunis.
- The International Feed-In Cooperation (IFIC) is a joint project between - until now - Germany, Spain and Slovenia. These three countries are convinced that feed-in tariffs are most suitable to effectively and efficiently promote renewable energies for the generation of electricity and would like to contribute to the improvement and the spreading of this policy instrument. The Cooperation has therefore been initiated to exchange experience on feed-in systems and help other countries improve their existing, or introduce new feed-in systems.
- SOLATERM is an EU funded project that brings research institutions, energy agencies, authorities and enterprises from EU and the Southern Mediterranean partners closer together. The project consortium with partners from 8 Southern Mediterranean and 5 EU countries has the aim to promote the application of a new generation of solar thermal systems in the Mediterranean partner countries. It combines the technological know-how of EU research institutions with the specific experiences and knowledge of the Southern Mediterranean partners. The EU partners provide important experiences in developing a successful political framework to boost the use of renewable energy.

ANALYSIS

Marc Darras - GDF SUEZ[1]

CLIMATE NEGOTIATION

Cancun, a welcome stock tacking meeting

Last year, in Copenhagen, the process has finished in full confusion (Cf. GEM 6, July 2010). On the one hand the announced decisions were not reached, on the other a group of countries proposed a new way forward (The Copenhagen agreement) without the unanimous support of the Convention. Since then, the pre-requisites we identified to give full steam to the Copenhagen meeting were not meet: no bill on Climate Change in the US; no conclusion on the way to finance adaptation and mitigation.

However, under a habile chairmanship of Mexico, the process was revivified bringing together all the parties to the Convention to consider the Copenhagen Agreement and the voluntary pledges of both developed and developing countries. They further resume their work on the two-tracks approach defined in Bali: The Long term Cooperative Action/ The Kyoto Protocol. Final conclusion should be drawn in Durban, 2011, on the basis of the recognition of the 2°C temperature elevation limitation, the voluntary pledges, the verification of implementation of measures, the continuation of a more dynamic CDM notably.

Meanwhile, on the road some elements of structure are put in place such as the organisation of the green fund, the framework for forest protection (REDD), the establishment of a technology transfer entity...

Let us analyse further these elements.

COPENHAGEN, A LOST OPPORTUNITY OR NEW IMPETUS?

In 2009, at the end of the Copenhagen Conference of the Parties to the UN Framework Convention on Climate Change, an agreement has been drawn in between very few heads of state, and proposed to the full conference which just took note of it and felt that the multilateralism in the UN system had been violated. Was it the end of the UN way to agree on decision by consensus of every nation in matter of conventions? Should an emanation of some G20 decides instead of the plenary?

As we analysed it, we proposed to balance this deficiency in governance with the contend of the agreement in term of impetus to the negotiation, because this agreement proposed important structuring elements in a few lines: a common target to limit the temperature elevation to 2°C –eventually 1,5°C, the creation of funds for mitigation and adaptation, an approach bottom up by pledges from every nation in term of emissions reduction, a positive compensation for forestry.

The Mexican presidency, and notably Mrs Espinosa , minister of foreign affairs, made an opportunity of the situation by a process of transparency in the negotiation

which blended the traditional elements of debate with the element brought forward by the Copenhagen agreement, taking into account the limits which have shown during the last year on the potential implementation of the agreement[2]

LONG TERM COMMITMENT VERSUS KYOTO PROTOCOL

Following the Bali meeting the negotiation was organised along two tracks: The Long Term Cooperative Action, AW-LCA, and Further Commitments under the Kyoto Protocol, AW-KP.

On the Kyoto Protocol, clearly no new commitments for the period post 2012 have been taken. Furthermore, Japan declared at the beginning of the session that it was not willing to go further with the Kyoto Protocol, because of the unfair participation to it. However, technical work has been carried over in order to avoid a gap between the first and second period. This covers the CDM and its evolution and the other project mechanisms, the effect of forestation and deforestation, spill over effects...

On the long term commitment, elements of the Copenhagen agreement have been discussed and inserted such has the goal to limit the temperature increase to 2°C in accordance with IPCC findings, the recognition of the pledges proposed following the Copenhagen meeting by developed countries, and of the volunteered information on mitigation and policy actions by developing countries, the institution for the "Green fund", the reorganisation of the technology transfer process...

Clearly, all difficulties are not solved as we will see in the following sections; however the best of the various approaches has been taken aboard.

THE VOLUNTARY PLEDGES

The Copenhagen agreement opened the possibility for developed and developing countries to make voluntary pledges for 2020, being or not a party to the Kyoto Protocol. The form taken is different depending of the countries: a reduction of the emissions for the developed countries, a set of policies and measures action for the developing countries. These pledges have been collected and made public by the secretariat of the UNFCCC.

The World Resources Institute[3] has made an analysis of the pledges in term of global emissions reductions. Beside important methodological points which are integrated in the Cancun meeting conclusions, in terms of volume the propositions achieving 12% to 19% reduction are far from the required 25%-40% by 2020 to be in the trajectory to limit the temperature elevation below 2°C. Cancun agreement does not conclude formally on how we move from this point on.

However, Cancun agreement analysed extensively the measurability, reportability and verification of the various policies and measures, notably when financed by the green fund, taking thus into account the remarks of developing countries concerning their sovereignty.

THE GREEN FUND

In Copenhagen, two financing mechanisms were proposed:

- a fast-start finance of 30 billion for the period 2010-2012 for adaptation and mitigation,
- a long term fund, which is to mobilize 100 billion by 2020.

In Cancun, the structure to manage the financing mechanisms of the Convention has been decided, at least for a significant part as stated in the text. It will be governed

by a board of 24 members from developed and developing countries in equal part, accountable to the Conference of the parties. The interim trustee will be the World Bank, this latter point having been very much discussed on the ground of governance and conflict of interest.

However, last year has not yielded concrete proposals for the origin of the fund. The text refers to ..."additional, predictable"... funding, which means that it should neither come from ODA, nor for unpredictable market prices such as in the CDM. Furthermore it mentions a "variety of sources, public and private, bilateral and multilateral, alternative sources". The task of the high level group created by Secretary General Ban Ki Moon at the beginning of 2010 did not propose concrete solutions in its report but rather made a review of potential sources. Some says the money will flow from selling quotas (which means in parallel some kind of constrains as in the Kyoto Protocol which is not supported by every party), from a tax on air ticket (some estimates goes for only 8 to 10 billion[4]). What does private money means here? Foreign Direct Investment? But then what will be the pay back? How will it be earmarked?

This shows one of the limit of the agreement and the need for further political will, at a time where economies and state budgets are in a recovering phase which may be longer than wished.

TRANSFER OF TECHNOLOGY

In term of structural reform, an important reorganisation of technology transfer framework took place in Cancun. The convention had a specific mechanism for promoting technology transfer, financially supported by GEF. The Expert Group on Technology Transfer working since the early years of the convention has proposed guidelines for the evaluation of technology needs both in the field of mitigation and adaptation, and notably helped Least Developed Countries in developing their adaptation plans. However, a more structured approach is needed in the framework of the Long Term Cooperation, and in view of the development of the Green Climate Fund and long term finance as contained in the Cancun Agreement.

The structure decided has two tiers: the Technology Executive Committee, at political level with a balanced membership of developed and developing countries will give orientation in this field and report to the COP; a more operational Climate Technology Centre and Network which will facilitate circulation of information, capacity building, technologies evaluation... taking benefit of the existing networks and technical centres.

The conclusions of the Cancun meeting mention further work to be done to establish the new structure at the next COP, one of the key elements for implementation will be the connexion with the financial mechanisms.

PROTECTION OF THE FOREST AND DEFORESTATION

One of the underlined success of the Cancun meeting has been the definition of an approach to Reduce Emissions from Deforestation and forest Degradation, REDD. Deforestation represents 10% of the emissions of greenhouse gases, and has a high potential for mitigation. However the question was how to value the non-deforestation for developing countries which use the land for economic purpose (industrial plantation, cattle grazing…). The mechanism proposed is based first on an evaluation, then on the definition of a measures and finally implementation. It is recognised that a compensation for maintaining the forest should be considered. This last element is directly connected to the financing process and has to be reviewed at the next COP.

THE WAY FORWARD

Cancun has been a very positive meeting after the experience of Copenhagen where much has been promised but little was achieved. Starting from the work of the convention, and the proposals contained in the Copenhagen agreement new ways have been explored and some structures put in place. The UN system is seen again as the place to find global solutions, respecting the interest of every party. However a deal is done and operational only once all the elements are in place: one key question is to find an equitable and pertinent funding at a time of an economic crisis. Much work has to be done there.

On another hand the two tracks defined in Bali (Further commitment under the Kyoto Protocol, Long term Cooperative Action) have run in parallel making progress. However the deadline for the first period of the Kyoto protocol is in one year from now and no hints of what will come is given.

Finally the question of the actions implemented nationally remains as recall R. Baron from IEA. These actions will give clearly more visibility to what can be achieved at minimal cost, then put the states in a better position to negotiate. This is clearly the question for the US, where the present administration is not in a position to pass a bill on this matter.

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[1] This is not a position of GDF SUEZ, but only of the author.

[2] http://unfccc.int/meetings/cop_16/items/5571.php
http://unfccc.int/home/items/5265.php ; http://unfccc.int/home/items/5264.php

[3] Kelly Levin, Rob Bradley. Comparability of Annex 1 Emission Reduction Pledges. Working Paper. WRI. Feb 2010.

[4] Benito Muller Time to roll up sleeves – even higher ! Oxford energy and environment Brief. The Oxford institute for energy studies. January 2011

ANALYSIS

Dr. Houda BEN JANNET ALLAL - OME

CLIMATE NEGOTIATION

Cancun, What did the EU and Mediterranean countries say[1]?

In Cancun, in their respective statements at the opening of the High-level Segment of COP16/CMP-6, the EU and the Mediterranean countries highlighted the following main issues/positions. It has to be noted that all south Mediterranean countries firmly believe that adaptation is an important response option along with mitigation based on the principle of "common but differentiated responsibilities" to which they remain firmly committed:

ANNEX I PARTIES

THE EU was ready for an international, legally binding agreement already in Copenhagen and expressed the need for Cancun to deliver *"something that paves the way towards the international agreement that the world needs to tackle climate change effectively."* The EU is, in particular, willing to consider a second commitment period under the Kyoto Protocol strengthening it, to make all efforts to assure that the two Celsius degrees objective is met and establish a new fund dedicated in particular to adaptation. Statements from member countries were in line with the EU declaration.

GREECE in contributing its share toward the EU's unilateral commitment for a 20% reduction of emissions by 2020, it has recently enacted legislation to increase the use of renewables so as to cover 20% of its final energy consumption and 40% of its electricity needs by 2020. It has also passed legislation to improve its building stock so as to reduce energy consumption from conventional sources to less than 10% of current levels by 19%. In addition, Greece informed about the recent launch by eighteen Mediterranean countries in Athens of the Mediterranean Climate Change Initiative which seeks to promote cooperative action among developed and developing countries in the region.

ITALY in particular launched an appeal calling China and USA for taking part in the process and assuming greater commitments against climate change towards a global agreement.

MALTA has adopted a "National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gases." The Plan contains mitigation measures aimed at reducing greenhouse gas emissions and including the implementation of renewable energy sources, electricity efficiency and conservation. Several measures are to be implemented including schemes for the promotion of solar water heaters, PV panels, energy saving appliances and energy saving light-bulbs distributed to each and every household according to the size of the family. Apart from the environmental benefits, with a onetime investment of around 9 million euros for incentives, the country will be registering national savings in electricity generation of approximately 7 million Euros per year. Malta joined the Mediterranean Climate Change.

MONACO achieved 9% of emission reduction in 2007 as compared to 1990 and its goal is to reach a higher level of emissions reduction than its commitment within the Kyoto Protocol. The target is also to reduce by 30% its emissions

by 2020 and to become carbon neutral by 2050. Monaco will also allocate 10% of its Official Development Assistance (ODA) in 2011 and 2012 to finance projects linked with climate change issues in the least developed countries.

PORTUGAL is on track to achieve its Kyoto target and is working towards its 2020 target to which the country is bound by EU law in the context of the EU's 20% reduction target. The country has put in place a comprehensive set of national policies, including a world-leading programme on renewables which will contribute to emission reductions and job creation; a process to define a roadmap for low carbon development for Portugal with key milestones in 2020, 2030 and 2050.

SLOVENIA is on track to meet its Kyoto target, mostly with domestic measures and sinks[2]. A draft of the Climate Act has been recently published which includes a long term objective to reduce the emissions to 2 tonnes per capita by 2050 and the legal basis for financial assistance to developing countries to address climate change.

SPAIN strongly supports EU to undertake efforts towards reducing its GHG emissions; take the leadership in this field and reduce its emissions at a level of 30% rather than 20%.

TURKEY is taking several steps in combating climate change. Comprehensive projects and programmes are undertaken in the sectors of energy, industry, transport, agriculture, forestry, waste management and other related fields. As for energy, extensive investments have been made to utilize hydro-power, wind and geothermal potential in an effective manner. The country aims at increasing the share of renewable energy sources in total energy production up to 30% by 2023. Extensive investments were encouraged in order to improve and expand public transport modes, as well as the improvement of fuel quality and use of bio-fuels in transportation. Moreover, Turkey emphasizes its special circumstances, being an Annex I country and member of the OECD and classified in a special position within Annex I countries because of its low level of historical cumulative GHG emissions. Turkey suggests that the country reduces emissions from the business as usual scenario and not with a specific base year and calls for further consideration on this.

NON-ANNEX I PARTIES

IN ALBANIA though 90% of the electricity is generated by hydro power, the country has engaged in more than 100 projects on hydro and wind energy, with a total power of over 2500 MW. An additional area of solar water heating panels of around 540,000 m² is foreseen for year 2025, and other projects on biomass-to-energy, biofuels, and sanitary landfills with methane capture have started their implementation. The overall aim would be to reach 40% reduction of GHG emissions in 2025 compared to 1990 levels. Albania joined the Mediterranean Climate Change.

ALGERIA gives the African point of view. Indeed, in Cancun, Africa spoke with one voice stating that it is looking forward

to being a continent of sustainable development and is in need of capacity building and green technologies. An initiative for Africa is needed.

EGYPT gives the point of view of the Arab League which also believes that adaptation and mitigation are important issues but also the need for developing countries to achieve concrete actions and real and substantial GHG emission reductions while helping developing countries. The Arab League calls for a specific fund dedicated at helping developing countries deal with negative impacts of climate change. Indeed, the Arab League underlined that several developing countries are already suffering from negative impacts on their economies and population because of climate change and the situation is expected to worsen in a business as usual scenario.

ISRAEL asserts that substantial progress has been made to achieve the Israeli commitment of 20% emissions reduction target by 2020 compared to a business as usual scenario. A government decision was recently passed for implementation of a National Action Plan including the following mix of policy measures: substantial financial support for projects reducing GHG emissions in the industrial, commercial and public sectors; investment in green building and retrofit; scrapping energy inefficient electrical goods and stringent regulations for new appliances; integration of environmental technologies; extensive educational programming and raising public awareness.

JORDAN underlines the importance of technology transfer and financial means. Moreover, Jordan has taken major steps to combat climate change in several fields. As for energy, a national strategy has been adopted with the aim for renewable energy to reach a share of 10% in total primary energy supply by 2020.

IN LEBANON, temperatures are projected to increase between 1°C and 5°C from now until the end of the century and rainfall is projected to decrease by 25 to 50% over the same period. Water is also a major concern. In this context, the country is taking voluntary commitment to increase its renewable energy mix to 12% by 2020. A National Water Sector Strategy is also under preparation taking into account the impact of climate change on the water sector.

LIBYA underlines the importance of cooperation in order to combat climate change and its willingness to pursue a sustainable path. Several decisions have already been taken in this regard and in particular in the field of water, energy (natural gas for electricity generation, high interest in solar energy, development of public transport ...) and land management. Libya also highlights the need for capacity building and technology transfer in addition to financial support. Moreover, Libya is also concerned about the negative impacts of combating climate change measures on countries whose economies are based on hydrocarbons and calls for specific actions on how to consider the negative impacts of implementing climate

change policies. Among others, Libya also suggests that important efforts be devoted to develop carbon capture and sequestration.

MACEDONIA is determined to increase the share of renewable energies in its overall energy consumption, from the current 15.3% to 21% by 2020.

MOROCCO is devoting important efforts to contribute to climate change mitigation and several programmes and actions have already been undertaken including a national charter for the environment and sustainable development. In the energy field, a national strategy has been adopted in 2008 whose main goal is to increase the contribution of renewable in the consumption of primary energy to 12% in 2020, 2000 MW solar-based power installed capacity by 2019, 2000 MW wind-based power installed capacity by 2020. Renewables will represent 42% of total power generation by 2020. Within this strategy, 2.5 Mtoe will be saved annually along with 9.7 MtCO2 avoided emissions (more details in GEM, issue N°6, special feature article by Minister Dr. Amina Benkhadra, pp 12-15). Morocco also stresses the need for clean technology transfer and international cooperation.

SYRIA is very vulnerable to climate change and negative impacts are already visible with the decrease of rainfall and important variability of temperature during the last five years which was dramatic for several villages in the country (on agriculture, health ...). Water is also a major concern. In this context, several actions have been undertaken including encouraging green investments also in the energy sector. The potential for wind energy is estimated at 8,000 MW and the objective is to reach 2,500 MW installed wind capacity by 2030 corresponding to a total investment of 3.5 bilion euros and a power generation estimated at 6.25 TWh per year.

PALESTINE[3] has taken major steps to combat climate change. Among other actions, the Palestinian Authority has developed a ten-year environmental strategy document to be updated every three to five years and approved an environmental law on 28 December 2009. The Law covers a wide range of environmental protection and management issues. It also encourages sustainable resource development for the benefit of future generations on the basis of intergenerational equity. Palestine looks forward to member states finding the political will to include it in the UN bodies (the current status is observer) and the Climate Funds established under them in order to allow Palestine play its role in confronting the effects of climate change.

To conclude, the vulnerability of the Mediterranean region to climate change, which is highlighted in recent IPCC (Intergovernmental Panel on Climate Change) reports and other studies, is real as confirmed in the statements of most of the South Mediterranean countries at Cancun. Negative effects of climate change are already noticed in many countries, affecting their socio-economic development. Effective actions are thus urgently needed, and as a result several measures are envisaged. There is a consensus at Cancun on the need to act. The EU is willing to strengthen its efforts provided other countries follow. South Mediterranean countries are also making efforts to follow a sustainable development path

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[1] The present synthesis is based on the statements available at the UNFCCC website (Cancun). A special attention was given to what governments have said in particular on energy issues. Countries have been classified in alphabetic order on Annex I and non Annex I Parties. We remind that Annex I Parties include the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States and non-Annex I Parties are mostly developing countries.

[2] Sink: any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. Forests and other vegetation are considered sinks because they remove carbon dioxide through photosynthesis.

[3] Observer.

OME LIFE

MEETINGS WITH MEMBERS

GENERAL ASSEMBLY. MARRAKESH

Hosted by ONE (Office National de l'Electricité), the next OME General Assembly will take place in Marrakesh. The General Assembly will review the activities of the Association and ratify the work programme for 2011-2012. A side event will also be organized at this occasion on the topic "Unconventional Gas in the Region".

EXECUTIVE COMMITTEE MEETING, DECEMBER 17TH, 2010, PARIS

The last meeting of the Executive Committee in 2010 was held in Paris on December 17th. Chairman Latif visited OME Office, met the staff and convened all Board Members to review the progress of ongoing projects and approve the work plan for 2011 that should be submitted to the General Assembly for ratification.

The meeting was also an opportunity to meet the Chief Economist Director of the International Energy Agency, Dr. Fatih Birol, who presented the conclusions of the recently published "World Energy Outlook 2010" and responded to the questions of Board Members.

OTHER MEETINGS WITH MEMBERS

On 27-28 October 2010, on the occasion of the 4th SNNK-WPC Workshop (Slovenian National Committee of the World Petroleum Council (SNNK-WPC) in Portoroz, Slovenia OME General Director and Director of Hydrocarbons met with high representatives of OME's members Petrol of Slovenia and INA of Croatia.

The General Director traveled to Amman in October to meet energy authorities and get overall information on the Jordanian energy balance. He also paid a first visit to NEPCO and FAJR, the national electricity company and the gas company respectively, to make a brief introduction of OME.

Also in October and accompanied by the Director of Hydrocarbons Division, Sohbet Karbuz, visited NOC, the Libyan National Oil Corporation, to present the proposal for an in-depth study on the Libyan energy sector in cooperation with GECOL, the Libyan electricity company and OME Member.

The General Director met Egyptian Members, EEHC and EGAS, the first week of December to analyze together the draft of the Egypt Study that had been submitted to all Members in November and once the input from other Members had been taken into consideration. The meetings in Cairo were very useful to collect up to date information and undertake the preparation of new scenarios to better cope with the different development alternatives raised by the Egyptian energy industry.

OME RECENT PUBLICATIONS

ONGOING PROJECTS

THE SECURE PROJECT

"Security of Energy Considering its Uncertainty, Risk and Economic Implications" (2008-2010). (General coordinator: OME).

Three Regional Stakeholders were held in the second half 2010. The first was held on 2 July in Moscow, the second was held on 19 October in Cairo, and the third was held on 8-9 November in Manama, Bahrain. Final Project meeting was held on 25 November in Brussels. Also, A Policy Event with the kind support of MEP Paul Rübig, Member of the European Parliament Committee on Industry, Research and Energy, was held on 16 November in Brussels. Meanwhile, OME finalized a report titled "Quantitative analysis of EU vulnerability to oil supply risks: modeling, risk estimates and discussion of optimal sizing of remedial actions" in July 2010. The project is finished at the end of 2010.
Website: http://www.secure-ec.eu/.

THE REALISEGRID PROJECT

"REseArch, methodologies for the effective development of pan-European key GRID infrastructures to support the achievement of reliable, competitive and sustainable electricity supply" (2008-2011). The last REALISEGRID Stakeholders' Board meeting was held on November 3rd, 2010, in Arnhem (The Netherlands).

OME finalized a report titled "Incentive schemes and regulation framework for transmission development in Europe" in April 2010.
Website: http://realisegrid.erse-web.it

"SOLAR WATER HEATING MARKET TRANSFORMATION AND STRENGTHENING INITIATIVE".

The project is funded by the Global Environment Facility and co-executed by UNEP and UNDP. OME is responsible for the implementation of the Knowledge Management and Networking component in the Mediterranean region. The goal of this project component is to share knowledge on best practices for the deployment of the solar thermal technologies. The overall objective of the project is to accelerate global commercialization and sustainable market transformation of solar water heating systems. OME recently prepared its deliverable on "Initial Market Assessment report" featuring with the state of the art of SWH market in Mediterranean region. The project will be finalised on March 2011.

SOLAR MED ATLAS

Funded by the German Climate Initiative for a two-year period, the project is coordinated by DLR and conducted by a consortium composed by OME, ARMINES, TRANSVALOR (France), GEOMODEL (SK), JRC (EU), RCREEE (Int.) and UNEP (Int.). The objectives of the project are to develop a high quality and easy accessible database of available solar resource in direct and global radiation in the Mediterranean and to disseminate relevant information to stakeholders. The database will be based on at least 10 years of solar radiation data and will offer annual and monthly global horizontal and direct normal solar radiation. The kick-off meeting took place In Stuttgart 25-27 October 2010. The next step for OME is the organization of a workshop with major stakeholders to assess their needs.

THE MED-CSD PROJECT

"Combined solar power and desalination plants: technico-economic potential in Mediterranean partner countries". (General coordinator: OME).

The project is completed. The deliverables have been submitted to the European Commission and have been approved. An "Action plan for the development of CSP and desalination in Mediterranean region" and the proceedings of the conference have been published. All deliverables, presentations and proceedings of the final conference are available at the OME website www.ome.org and at the **project website: www.med-csd-ec.eu.**

ENERMED 2

ENERMED (Energy in the Mediterranean) Training Workshop is a training program designed for all junior staff of OME Members, willing to acquire a general training on energy and to better understand the energy changes in the Mediterranean. ENERMED Session II will be held on April 27th, 28th & 29th in Nanterre. The objective of ENERMED is to give participants new insight on the energy context of the Mediterranean ; energy fields, actors, financing, regional cooperation, institutional framework, regional initiatives, risks, energy security, perspectives, energy efficiency and climate change, etc. The Workshop also aims at building a network, setting up a platform for knowledge sharing, and facilitating communication among future energy leaders. Speakers come mainly from OME staff and leaders of Member companies as well as highly distinguished external experts. More information are available at **www.ome.org.**

OME/IPEMED CONFERENCE

OME organized in cooperation with IPEMED ("Institut de Prospective Economique du Monde Méditerranéen") a seminar "Energy & Sustainable Development in the Mediterranean" on 25-26th November 2010 in OME's premises. The seminar gathered more than 50 participants, among them decision makers, experts, NGOs, local governments, universities, research institutions, companies and agencies. The main features highlighted were prospects and scenarios for energy in the Mediterranean region, the challenges and opportunities for renewable energy and energy efficiency, the necessity of building a strong network of stakeholder in these fields, financing issues. Presentations and proceedings are available at **www.ome.org.**

TECHNICAL COMMITTEES ACTIVITIES

ELECTRICITY COMMITTEE

The next Electricity Committee will be held at the OME on the 14th of March 2011, in cooperation with the RES Committee, in order to discuss about some future common activities. During the Committee it will be presented also the plan of the forthcoming report concerning "The institutional framework of the electricity and natural gas industries in Southern and Eastern MED countries", expected after summer. A discussion paper titled "TSO remuneration and incentivization policy for cross-border transmission investments" will also presented, within the European project Realisegrid. The South/North electricity market integration will be at the heart of the future actions which concern regulatory, financial and technical issue (article 9, European funds, AC/DC cross-border networks, etc.). A comprehensive overview of the "MSP" ongoing projects will be also drawn (Dii, MED-GRID, Paving the way, etc.).

Finally, a proposal for the task force on nuclear energy and a preliminary workshop will also be discussed, in order to draft the first considerations to launch a nuclear power programme in the South Mediterranean.

HYDROCARBONS COMMITTEE

Members Only OME Discussion papers titled A Review of Natural Gas Transmission Companies in Euro-Mediterranean Region" and "Legal Status of Caspian Sea and Implications on Hydrocarbons Resources and Transport Means" were released in June 2010 and July 2010 respectively. Another Discussion Paper titled "A Review of Natural Gas Pipeline Developments in the Caspian and Black Sea Region" is under review process by OME Member Companies. Those reports as well as other ongoing Hydrocarbons Committee projects were discussed at the Hydrocarbons Committee meeting held on 7 July 2010 at EGAS Headquarter in Cairo, Egypt.

RENEWABLE ENERGY AND SUSTAINABLE DEVELOPMENT COMMITTEE.

The RESD Committee meeting took place in Madrid on 15 and 16 November 2010, hosted by Iberdrola Renovables. Four main topics were presented and discussed among members: past, present and future development of renewable energy in Spain (presented by Mr. Ramon Fiestas), RESDC membership criteria, overview of OME activities, work programme 2011-2012.

At the occasion of this meeting, participants also benefit from three technical visits kindly hosted and organized by IBERDROLA RENOVABLES: the control centre of Iberdrola Renovables plants, the 50 MW thermosolar plant in Puertollano and the ISFOC test centre for concentrating PV technologies.

A web conference was also organized on 14th December as a follow-up of the Madrid meeting with the aim of approving

the work programme of the RESD Committee based on the draft document prepared by the RESD Division and input from members before and following the Madrid meeting.

Members approved the following five action lines which structure the scope of work of the RESD committee and division:

1. Renewable energy and energy efficiency in the energy systems
2. Enabling policies and measures
3. Investment and finance
4. Technical and economic evaluation of technologies
5. Support to members, knowledge management, outreach and networking.

More information about RESDC meeting in Madrid, technical visits and work programme are available in the RESDC newsletter No.3 released in January 2011 and downloadable at **www.ome.org.**

The next RESDC will take place on 14-15 March 2011 in Paris. It will take place back to back to the joint IEA REWP and RETD workshop on March 15-16 2011, in which all members of the Committee are kindly invited.

MEDITERRANEAN ENERGY PERSPECTIVES

MEP Egypt: The Mediterranean Energy Perspective – Egypt energy study is the first in a series of country studies. It proposes a specific in-depth analysis from the Mediterranean Energy Perspective (MEP) series. This study provides insights into the country's energy situation today and over the next two decades through 4 energy scenarios. This report is filled with data, figures, tables and analysis that stretch some 400 pages and represents the input from numerous experts. This report is in the last phases of completion under review and discussion by OME Egyptians members.

MEP: Mediterranean Energy Perspectives 2011 (MEP 2011) assesses the energy outlook for Mediterranean energy markets through 2030. MEP 2011 provides an in-depth analysis of and projections for 24 Mediterranean countries and aggregates. This edition of MEP is based on an exclusive in-house model that brings to light an alternative, nongovernmental view of how energy demand might evolve in the Mediterranean countries. MEP 2011 is under progress and should be released in the first half of 2011.

FORTHCOMING EVENT: MED-GULF CONFERENCE

OME is planning a high level MED-Gulf Conference in Cairo (Egypt) to celebrate its 20th anniversary. The objective of the Conference will also be to review challenges and opportunities for effective and win-win cooperation between the Mediterranean and the Gulf region in a different worldwide energy context. The outcome of the Conference will be a joint declaration for a new kind of relation producers-consumers and on policy recommendations to energy authorities to approach issues of common concern. More information and details at **www.ome.org**

COMMUNICATION

- Matteo Urbani, "Infrastructure requirements for the Mediterranean grid development", presentation at ZeroEmission Conference, 8-10 September, Rome – Italy.

- Matteo Urbani, "Euro-MED Energy Context: RES Development and Infrastructure Requirements", presentation at the Maghreb/Middle East Renewable Energy Summit, 18-19 October 2010, Marrakech – Morocco.

- Nicolas Cottret, Projet MED-CSD - Combined Solar Power and Desalination Plants: Techno-economic potential in Mediterranean Partner Countries, Xlièmes Rencontres Rencontres méditerranéennes, Beaumes les Aix, 24-29 octobre 2010.

- Sohbet Karbuz, "Oil and Gas Pipeline Projects in Relation to European Energy Security", presentation at the Fourth World Petroleum Congress Slovenian Chapter Workshop, 27 –28 October 2010, Portorož-Slovenia.

- Sohbet Karbuz, "Gas Infrastructure Developments in the Wider Mediterranean Region", Presentation at the 3rd Meeting of the UNECE Gas Centre Task Force on Supply, Infrastructure and Markets, 3-4 November 2010, Cairo.

- Houda Ben Jannet Allal, The Mediterranean Solar Plan, INSEAD Energy Club, 22 November 2010, GDF Suez, Paris, France

- Sohbet Karbuz, Presentation at The Future of Turkish Energy Market Regulations and Policies Towards 2030, organized by the Turkish Energy Experts Association and Turkish Energy Market Regulatory Authority, 25-26 November 2010, Ankara, Turkey.

- Houda Ben Jannet Allal, Efficacité énergétique et énergies renouvelables en Méditerranée: il est temps de changer d'échelle, Greater Mediterranean Seminars, Energy & sustainable development, OME/IPEMED Conference, 25-26 November 2010, Paris, France.

- Houda Ben Jannet Allal, Sustainability issues Water, energy, agriculture and climate change, EuroMed 2030 Conference, 16 December 2010, European Commission, Brussels, Belgium.

HOW TO REACH OME

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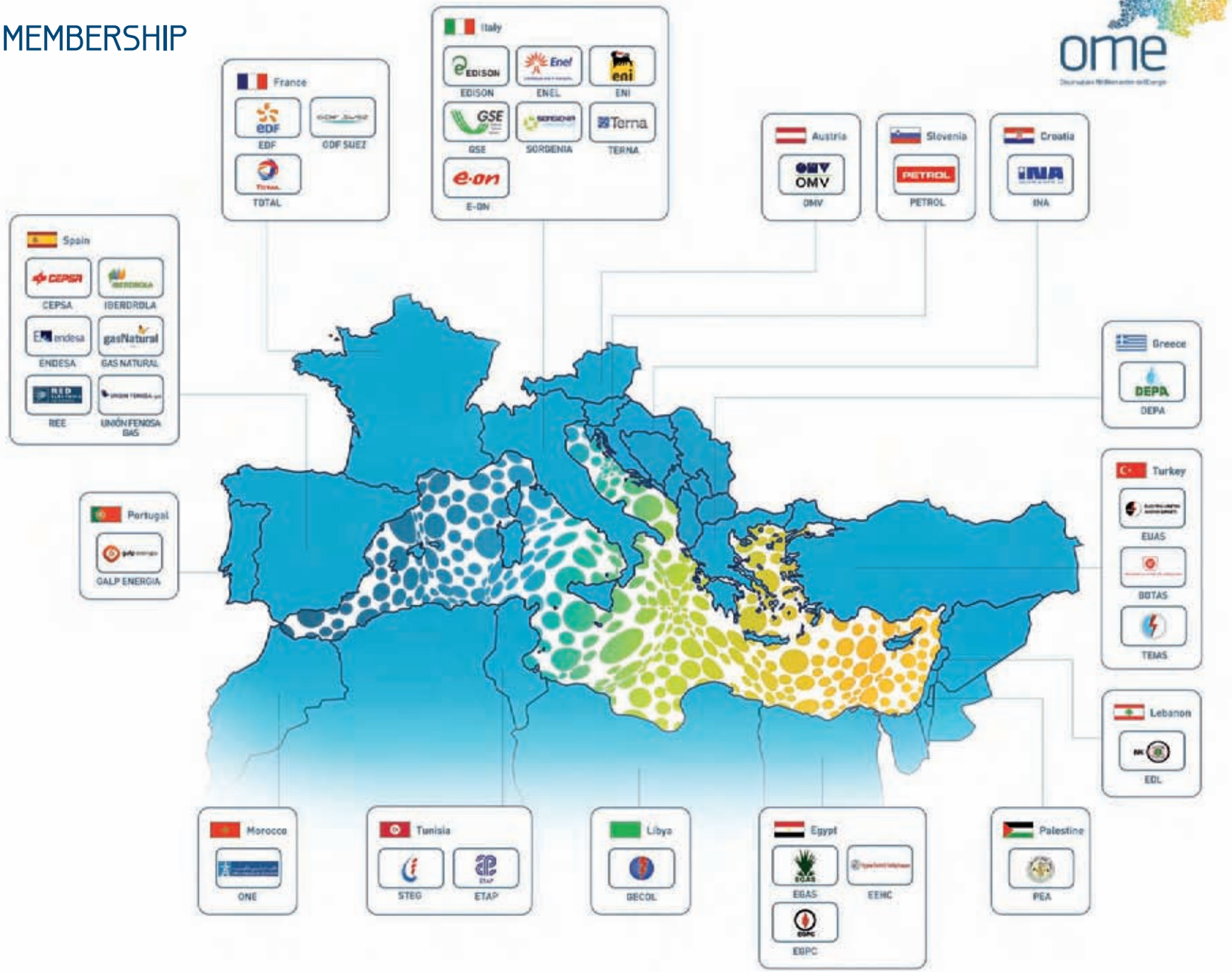
ACCESS BY TRAIN / RER

- OME Office is just one station from La Defense and about 7 minutes from Paris Charles de Gaulle-Etoile
- From Charles de Gaulle or Orly airport, take RER B → stop at Châtelet station
- Connect by taking RER A (direction Cergy-Poissy or St-Germain en-Laye) → stop at Nanterre-Prefecture station
- Take Esplanade Charles de Gaulle exit, passing by Mercure hotel, keep walking straight, cross the road and go straight ahead till you reach 105 rue des trois Fontanot (about 2 minutes walk)

OME MEMBERSHIP



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